THE GANGES CIVILIZATION

DR. T.N. ROY

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Dr. T. N. ROY

RAMANAND VIDYA BHAWAN

THE HERITAGE OF ANCIENT INDIA

No. II

THE GANGES CIVILIZATION

A CRITICAL ARCHAEOLOGICAL STUDY OF THE PAINTED GREY WARE AND NORTHERN BLACK POLISHED WARE PERIODS OF THE GANGA PLAINS OF INDIA

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Dedicated to

MOTHER GANGA

The pivot of our culture providing perennial vitality to the society and
acting as the strongest bond; a picture of stability and eternal
tranquillity, in whose generous care, we Indians have grown to be as
we are and in whose holy water we have washed our recurring
sins; her cultural heritage has been all pervasive and its
dominance is still reflected in the traditional veneration
attached to several rivers of the country, such as
Kaveri and Godavari, called the Ganga
of the south, thus suggesting the
'Gangaisation' of the Indian culture.

PREFACE

Ever since my appointment in the Department of Ancient Indian History Culture and Archaeology of the Banaras Hindu University in 1960, I have been actively associated with the excavations of sites like Rajghat (Varanasi), Sarai-mohana, Prahladpur, Takiaper, Ayodhya and Kampil, all of which lie within the Ganga Plains of India. Geologically the youngest, economically the most useful and culturally constituting the main axis of India, the Ganga Plains project itself as a single ecological unit. The dominant role of Ganga as emphasized by geographers is reflected in the litanies which we sing in praise of this river. In holy cities, like Varanasi on its bank, with the dawn of the day, frantic activity begins along the ghats. Thousand of men, women and children drown the morning in noise, bathing and chanting their prayers and, in blind faith, giving over the burden of their sins to the mute, uncomplaining river. Whether this importance of the Ganga Plains as well as the Ganga could also be explained in archaeological terms was a matter which drew our attention. Sir Mortimer Wheeler, while departing from India, also suggested that, 'we in India should turn to the Gangetic Valley, for the Ganges had given us our faith, whereas the Indus has given India its name'.

An opportunity to investigate the above problem presented itself when I was asked to direct the archaeological excavations at Prahladpur in 1963, at a time when Rajghat was also being excavated. And, when I was excavating Prahladpur, I came across a significant evidence. Considerably preceding the earliest occurrence of NBP, in a distinct well stratified horizon (Sub-period IA), I found black slipped ware in prolific number and shapes. It was maintained throughout the occupation levels of Sub-periods IA and IB which represent nearly 3.06 m thick deposit. Since it was found superimposed in Sub-period IB by well known NBP dated from about sixth-fifth to second century B.C., I suggested a date of 800 B.C. for the beginning of Sub-period IA and consequently for the beginning of this ware at the site. The fact that till then no black slipped ware was reported in such a distinct context, prompted us to call this level as 'pre-NBP'. The same pre-NBP context of the ware was observed by us at Rajghat, Sarai-mohana, Masoan, Sonepur and Chirand, etc. What was more significant was that this black slipped ware was exactly similar in technique, texture and typology with the black slipped ware found associated with the PGW at Hastinapura. Encouraged by this find and by the discovery of the black slipped ware in the lower levels of several other excavated as well as explored sites of eastern U.P. and Bihar, the author published a paper[1] in 1964-65, hinting that black slipped ware is the earliest and the basic representative pottery of the Ganga Plains. A special feature of assemblage at our sites was the paintings found on the black slipped ware. The paintings consisted of a group of wavy lines of unequal thickness picked out in ash-grey by stopping the remaining body with a thin dark slip. Such type of painting was also reported in the grey ware sherds of Hastinapura. Plain grey ware, though extremely rare at our sites, undoubtedly belongs to the same category as the plain grey ware specimens from Hastinapura. The red ware shapes associated with the so-called pre-NBP deposit at Prahladpur and Rajghat also have many common types with the PGW phase of Hastinapura. The entire evidence from these two desperate deposits, the PGW and the pre-NBP, was therefore, reconsidered afresh by us and on that basis, I was able to contribute a paper entitled 'Pre-Northern Black Polished Ware Deposit' at Painted Grey Ware Seminar held at Aligarh Muslim University in 1968. The conclusion drawn in this paper was that pre-NBP deposit of the Middle Ganga Plain has many similarities with the PGW phase of the Upper Ganga Plain. This conclusion evoked great interest among scholars present in the seminar and many comments for and against were raised by B. B. Lal, A. Ghosh, A. K. Narain, R. C. Agrawal, Nurul Hassan, S. P. Gupta, R.C. Gaur and M.D. N. Sahi. This was, however, one aspect of the approach. The author was no less anxious to ascertain the relation of the 'pre-NBP and PGW deposits with NBP, for by this alone was the picture expected to become clear and complete as far as the study of the PGW and NBP, the twin denominators of the Ganga Plains, are concerned.

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[1] T.N. Roy, 'Stratigraphical Position of the Painted Grey Ware in the Gangetic Valley', *Bharati*, no. 8, Part II, (Varanasi, 1964-65), p. 76.

For the study of the excavated sites of the Ganga Plains, a very significant event indicating cultural development has been the arrival of the PGW or NBP at a particular site. This stage of cultural development marked by the introduction of these two wares is popularly known as PGW Period or NBP Period or culture. The problem of their beginning, dating, diffusion and the allied issues has attracted the attention of archaeologist, historians and scientific workers for several years. The increasing interest in the subject is not only due to its natural attraction, and variety and richness of these wares, but also because they are considered as a dominant attribute of one of the earliest Iron Age cultures of India. Attempts has also been made to associate them with ethnic movements or with two Indian epics, the *Mahabharata* and *Ramayana.* Even then, their study remains disjointed. Both the wares now occur in widely differing contexts and they have not yet been properly correlated to produce a coherent picture. It may, therefore, be of importance if we could identify the culture or cultures where they were first used and determine their further manifestations if any. It has been correctly asserted by Soundara Rajan that, 'reorientation of archaeological data has at no time been more strongly indicated than now[1]'.

Nearly three decades ago, B.B. Lal, in his report of the excavations at Hastinapura, suggested that Periods II and III of the site, characterised respectively by the PGW and NBP, may be dated to *circa* 1100-800 B.C. and *circa* early sixth to third century B.C[2].

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1. K. V. Soundara Rajan, in *Potteries in Ancient India,* (Patna, 1969), p. 35.
2. Notwithstanding the views expressed by several scholars, Lal has not only reaffirmed his span of PGW from *circa* 1100-800 B.C. in the PGW seminar at Aligarh in 1968 but has also pushed its antiquity to 1115 B. C. in 1973 (Lal, 1973, p. 4). In 1980 (Lal, 1980, p. 79), after calibrating PGW dates from various sites he has said that PGW cannot be later than 1000 B.C. and may well go back even earlier. It ceased to exist by about the middle of the first millennium B. C.

It was further observed that there was a time gap between these two deposits. In so far, as the chronology and stratigraphy of these wares was concerned, the implication was that these remained in use in the same time-span and that there was no overlap between these two periods. Despite the fact that this proposed chronology and stratigraphy had many critics and that several PGW and NBP sites had been vertically excavated, the results from these sites were mainly confined to the sequences based on these two potteries. No body can disagree with the limitations of a vertical excavation, and the fact that the PGW and NBP are explicitly mirrored in the whole assemblage and are marked by their vast number, maleability and distinctive fabric reflects the current of cultural influences. But a somewhat exaggerated emphasis on these wares has kept us divorced from other elements which may also form the part of our system of demarcating cultural periods and thus tell us something about the dynamics of a culture. This has resulted in a muddle that arises by mentioning 'PGW Period' or 'NBP Period' or PGW deposit or NBP deposit or Phase A, Phase B or Phase I etc. Can we change the period with the introduction of one new element (*i.e.* PGW or NBP), when the remaining elements of a culture continue in a deposit ? Can the absence of only PGW or NBP prevent a deposit from being called as belonging to PGW or NBP Periods, when on the basis of other cultural equipments we can definitely associate the same with the PGW or NBP cultures ? In one of the meetings of the Central Board of Archaeology it was decided that when 'most elements change and new elements come in, it marks the change to next period'[1]. It is thus difficult to trace the gradual and precise development and fix the chronology of a particular antiquity in such vaguely termed periods. The concept of PGW and NBP has now changed. They have outgrown their limit and definition and are now a big institution under which several other varieties of ware find their affiliation. PGW and NBP, at best, are one of the dominant attributes of a culture and not culture itself[2]. Both by themselves cannot be regarded as safe criteria for dating because they are found to occur in differing contexts. PGW is now found in non-iron late Harappan, non-iron late chalcolithic, Early Iron Age and Late Phase of Iron Age contexts. NBP continues from 700 B. C. into the Mauryan and the Sunga times. We feel that some of the other cultural equipments which are also uniformely distributed in a particular period on number of sites may also have something to tell about the dating, currents and cross-currents in a particular culture. To cite one such example, viz., the introduction of iron in a particular occupational strata. For the cultural development of any country, one of the significant events indicating a technological development and of great economic consequence is the arrival of iron, specially the knowledge of iron-mining and smelting. In recent years, the study of the Iron Age cultures of India has received a new spurt of attention at the hands of scholars. Uncertainty still exists about the chronological horizons of different deposits in which iron objects have been found and

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1. B.K. Thapar, in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), p. 515.
2. B.K. Thapar, V.N. Misra, S.P. Gupta and Enrich have also made similar observations, but in other contexts.

many theories have been put forward for and against considering a culture as Iron Age on the basis of quantum of tools found in the excavations. It would be no exaggeration to state that this awareness, to a large extent, is due to the current better understanding by archaeologist of the impact of the beginning of iron on the socio-economic development of a culture[1]. B K. Thapar, while initiating the panel discussion on the 'Terminology and Periodization of Archaeology' at the symposium on Radiocarbon and Indian Archaeology at Bombay in 1973, remarked, 'Whenever such an important event, such as the advent of iron, takes place, I think the period ought to change despite the continuance of earlier elements. However, it could be designated as sub-period, if all the other important cultural elements continued'.

Besides the above, there are some important recent discoveries which also compelled us to scrutinize and revaluate the whole archaeological data. The view[2] that PGW people did not cross the hilly tracts of the Himalayan ranges, they used limited iron objects, they were one of the earliest to use iron and also that 'any revolutionary role cannot be attributed to iron in social changes preceding the 6th century B.C.[3]', does not hold good now. For we have now a clear phase of PGW culture at Thapli on the bank of Alaknanda in Tehri Garhwal in the remote part of the Himalayan region, finished large number of iron objects from the earliest level of the PGW and iron not only from the pre-PGW black-and-red ware phase from Noh and Kausambi but from levels IB and IC of Protohistoric Ahar. As already noted above, in 1964-65 the author for the first time[4] pointed out the overlap of the PGW with NBP. Now this overlap phase of the PGW and NBP is well indicated on sites like Kausambi, Sringverapura, Atranjikhera, Jakhera, Mathura, Hulas, Pariar, Sravasti and Ahichchhatra. Its relation with the PGW culture on the one hand and the NBP culture on the other has yet to be clearly defined. There are a few sites on which although the PGW is totally absent, the other cultural equipments do indicate that the deposit corresponds with the PGW culture. Similarly, there are several sites on which NBP is totally absent, yet on the basis of other cultural equipment, they can definitely be associated with the NBP Period or culture. On sites like Koldihwa and Pandu Rajar Dhibi, the Early Phase of Iron Age (to which PGW and Early NBP also belong) is devoid of both PGW and NBP. Now we have an antecedent

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[1] Recently, this awareness of the impact of the beginning of iron on the socio-economic development of India is seen in the writings of A. Ghosh, 1973; D.K. Chakrabarti, 1973; R.S. Sharma, 1974 and M.D.N. Sahi, 1979 (unpublished Ph. D. Thesis).

[2] Vibha Tripathi, *The Painted Grey Ware—An Iron Age Culture of Northern India*, (Delhi, 1976), p. 8 and p.107.

[3] Dilip. K. Chakrabarti, 'Beginning of Iron and Social Change in India', *Indian Studies Past and Present*, Vol. XIV, no. 4, (July—Sept., 1973), p. 338.

[4] T. N. Roy, 'Stratigraphical Position of the PGW in the Gangetic Valley' *Bharati*, no. 8, part III, (Varanasi, 1964-65), pp. 64-65. K.K. Sinha in 1967 and M.D.N Sahi in 1974 also reiterated the existence of an overlapping phase between the PGW and NBP.

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chalcolithic culture characterized by black-and-red and black slipped wares on almost the whole of Ganga Plains which continue to exist significantly with PGW and Early NBP deposits. *Perhaps the evidence now show that we cannot easily undermine the importance of the black-and-red and black slipped wares as the basic representative pottery of a community occupying the whole of Ganga Plains on which the PGW impinges from the west and a little later NBP does the same from the east.*

All these factors lead us to re-examine the whole mass of material from the vaguely termed 'PGW and NBP Periods or culture' in relation to the preceding black-and-red and black slipped wares and the succeeding Saka-Kushan cultures. And our approach has been to study the total assemblage rather than the pottery alone. The present study, therefore, also incorporates some of the findings of my original doctoral thesis accepted by the Banaras Hindu University in 1977.

The limitation of the source material stands in our way for full estimation of this fascinating aspect of cultures belonging to Iron Age of the Ganga Plains (the present study excludes the other Iron Age cultures of India like the Megaliths and the black-and-red ware culture associated with iron found outside the Ganga Plains). However, the present stock-building from nearly sixty sites so far vertically excavated in the plains may serve to emphasize the need for exposing the remains of a few Iron Age settlements on a wider scale.

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Introduction

1. Role of Ecology and Technology :

It is for some good reasons that we are opening the account with the geographical factors. Geography is now no longer a narrative of dull facts about the earth but it should show the relationship between the human being and the physical features influencing them through the ages. It is to interpret human life in this light and to remodel it in order to derive the maximum benefit to mankind from nature. Every region has its own character to which man, plant, soil and atmosphere contribute a lot and so is the case with the Ganga Plains of India. So a strict demarcation between geography on the one hand and archaeology and history on the other is neither possible nor desirable. The raw material is common to all the three sister branches. Subbarao has rightly put it that 'For an intelligent understanding of the pattern of development of cultures in India, one should begin with the geographical factor'.[1] Febvre on the other hand explained, 'There are no necessities, but everywhere possibilities, and man, as master of the possibilities, is judge of their use.[2] A rough demarcation between man and nature, however, cannot be made and as Norman Pounds explained, 'Wherever man and natural products are concerned the 'idea' intervenes'.[3] The problem before us is to what extent environment guides the development or decline of a particular culture or civilization ? Febvre puts the nature in the forefront and said "natural regions are simply regions of possibilities for human groups". But Subbarao does not believe in the sovereign influence of the environment.[4] Megger on the other hand is of the view that the development of a culture depends upon the agricultural wealth of the site.[1] Griffith Taylor gives more importance to men and says that the rate of the progress of a civilization is controlled by the man, nature simply determines the plan and route along which the man develops his plans.[2] Most geographers are inclined, as it should be, to overemphasize the influence of nature on the development of culture. The importance of the environment was well realized when man was in the primitive stage. His technology was underdeveloped and naturally he had to depend more on the physical environment. D. P. Agrawal, therefore, in archaeological study laid much emphasis on the role of technological studies in the background of ecological factors.[3] According to him when the Harappans were pushed into the peculiar ecology of the Doab, they withered. The Copper Hoard people also could not clear the primeval forest of the Doab with their knowledge of copper technology. The urbanization of Ganga Plains, therefore, had to wait till the advent of iron.[4] D. D. Kosambi also felt that large-scale clearance of forest in the Gangetic valley was not possible without the introduction of iron.[5] According to A. Ghosh, the jungle, if any, could be equally cleared by copper-bronze tools. Besides this there was another way of clearing of forest without any metal *i. e.* by burning it.[6] He further says that "No doubt in a slow moving society the impact of iron was slow". The metal did not produce any spurt in the material prosperity of the PGW people, supposedly the earliest iron-users in the Doab. The iron-using PGW people were not the first to settle in the Ganga Plain. The cultural sequence of the plains now begins with the Lower Palaeolithic to Mesolithic, Neolithic and then with the Harappans. After the Harappans the first settlers were the users of OCP and Copper Hoards. But the beginning of the colonization of the plains starts with the chalcolithic folk. There are now definite evidence of a permanent habitation stratigraphically underlying the deposits of the Iron Age settlements (the PGW and NBP in the west and east of the plains respectively) in the whole of Ganga Plains. The date of the beginning of iron at both PGW and NBP sites is almost similar. The earlier chalcolithic elements continue to exist significantly even after the introduction of iron. The point is that the small and sporadic settlements of the chalcolithic people were possible in the plains and become deep rooted only with the use of iron and consequently with the start of the Early Phase of Iron Age. With the beginning of the Late Phase of Iron Age by about 400-300 B.C., due to extensive trade, craft specialization and organized social structure, the culture spread beyond the limits of the plains. Its spread by this time does not show ecological uniformity.

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[1] B. Subbarao, *The Personality of India, (Baroda, 1958)*, p. 8.

[2] Febvre, *A Geographical Introduction to History*, (1925), p. 24.

[3] Norman Pounds, *An Historical and Political Geography of Europe*, (*London, 1947*), p. 521.

[4] B. Subbarao, *op. cit.*, (1928), p. 9.

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[1] J. Betty Meggers, 'Environmental limitations on the develoment of Culture', *American Anthropologist,* Volume 56, Part I, No. 5, pp. 801-824.

[2] Griffith Taylor, *Geography of the Twentieth Century,* (London, 1953), pp. 14-15.

[3] D. P. Agrawal, *The Copper Bronze Age in India,* (New Delhi, 1971), p. 2.

[4] D. P. Agrawal, *op. cit.* (1971), p. 228 and 243.

[5] D. D. Kosambi, *The Culture and Civilization of Ancient India in Historical Outline,* (London, 1956), p. 48.

[6] A. Ghosh, *The City in Historical India,* (Simla, 1973), p. 10.

A considerable portion of the country, no doubt, during this period was in the threshold of urbanisation It may not. however, be proper to attribute all these due to the advent of iron, as said by D. P. Agrawal and R. S. Sharma.[1] As Dilip K. Chakrabarti has pointed out in no case did iron bring about a noticeable change in the material prosperity of the people soon after its appearance. Iron did make the already existing village structure economically more productive but we prefer not to attribute any revolutionary role to it in the social changes preceding the sixth century B. C.[2] In other words, we do not find the exclusive influence of the environment and technology on the progress or decay of the culture. This is especially true as we move from 400-300 B. C. onward, *i.e.* with the beginning of the Late Phase of Iron Age onward to medieval, modern and recent when physical environment is seen to have had a less and less restrictive influence. So man as different from the rest of animate being is able to develop his material environment as the time advances and with the gradual evolution in the refinement of his technology, the nature automatically looses its primary importance and hold. Even then if the man succumbs to it, it is because its material, moral and technological development has not maintained an adequate and regular pace. Within the first half of the first millennium B C., there were in India a number of early iron-bearing foci— Baluchistan and the north-west, Malwa and Tapti valley, south India and the Megaliths and the Ganga Plains, the last mentioned being the main concern of this study. The same may be said about the antiquity of iron and about the issue of the earliest iron-users of this sub-continent, for there has been a good deal of writing on these issues.[3] One would have wished that all these works had contained the problems linked with the total impact of the Iron Age and not merely the possession of iron objects. In this connection N. R. Banerjee's remark[4] that 'The mere acquaintance with the use of man-made iron, was not also enough to usher in the Iron Age', is very pertinent. But this is not possible unless scientific-cum-typological examination of iron finds are made. However, by a thorough study of the main ingredients of not only iron objects but other cultural assemblage of the Early and Late Phases of Iron Age, one can have an idea of these settlements, which has not been analysed in detail in earlier works.

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[1] In a important paper 'Material milieu of the birth of Buddhism', read by R. S. Sharma in the 29th International Congress of Orientalists held at Paris in 1973, he said that the primary factor that revolutionized the material life of the people around 700 B. C. in eastern U. P. and Bihar was the beginning of the use of iron.

[2] Dilip K. Chakrabarty, 'Beginning of Iron and Social Change in India', *Indian Studies, Past and Present*, Vol. XIV, No. 4, (1973), p. 338.

[3] These issues have been discussed with full references in N. R. Banerjee's monumental work, *The Iron Age in India*, (Delhi, 1965); Dilip K. Chakrabarti, Beginning of Iron in India, Problem Reconsidered, *Perspective in Palaeoanthropology*, (Calcutta, 1973), pp. 345-356; Dilip K. Chakrabarti, Beginning of Iron and Social Change in India, *Indian Studies, Past and Present*, Vol. XIV, No. 4, (1973) and M. D. N. Sahi, Comparative Chronology of Early Iron Age Cultures in India (A Study of the role of iron in Socio-Economic change), unpublished Ph. D. thesis, Aligarh Muslim University, 1979.

[4] N. R. Banerjee, *op. cit.* (1965), p. 2

2, Considerations in Indian Regionalism :

India, that is Bharat (8°4′N—37°6′N and 68°7′E—97°25′E), the land of the pious Ganga and revered as *Bharat Mata*, despite its partition into two great states, still remains relatively as a geographical isolate. However, its dimensions and physical features, etc., are such that one principle, howsoever logically applied, simply cannot work as a device for the regionalization of a large country like India.[1] Regions prepared by Meteorological Department of India and Census Department have been of limited value. The earliest scheme of broad regionalism was brought by McFarlane. But more substantive work was done by L. D. Stamp which was in agreement with the scheme drawn simultaneously but independently by Baker. These are three primary or macro-level regions worked out for the whole of India. (1) The natural regions of the Mountain Wall (2) The natural regions of Northern Plain and (3) The natural regions of Indian Plateau. This division was held valid for a long time but was criticised by Pithawala who presented a scheme set forth mainly on the basis of physiographical uniformity. But this again did not find support from Kazi S. Ahmad who brought four macro-level divisions of India, separating the Coastal Plains from the Indian Plateau. O. H. K. Spate is of the view that there are not three or four divisions but five. He further divides the coastal lands of Ahmad's into En (eastern) and Wn (western) littorals. The regional scheme proposed by R. L. Singh and others in their, '*India, A Regional Geography*' in 1971, on the basis of geology, structure, relief and physiography, provides a fairly clear division of India into four units, viz., the Himalaya Mountain Region, the Great Plains, the Peninsular Uplands and the Indian Coasts and Islands. The Great Plains are geologically youngest, economically valuable and culturally most significant of all the divisions. These are further divided into (1) Rajasthan Plain, (2) Punjab Plain. (3) Upper Ganga Plain, (4) Middle Ganga Plain, (5) Lower Ganga Plain and (6) Assam Valley. We shall give below the delimitation of the three divisions of the Ganga Plains *i.e.* Upper, Middle and Lower as presented in '*India, A Regional Geography*', and will try to see how far it is valid also archaeologically.

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[1] For a detail study on this topic readers are referred to the following sources : J. N. L. Baker, Notes on the Natural regions of India, *Geography*, Vol. XIV, (1928), pp. 447-55; Maneck B. Pithawala's, '*The Need of Uniformity of the Physiographic Division of India*', 1939 and subsequently revised see *Journal Madras Geographical Association*, Vol. XIV, No. 4, (December, 1940), *Proceedings 29th Indian Science Congress*, Banaras, (1941), Part IV, pp. 71-75 and Physiographic Divisions of India, Burma and Ceylon, *Science and Culture*, Vol. VII, No. 11, (May, 1942), pp. 535-543 ; Kazi Ahmad, Physiographic Divisions of India, *Indian Geographical Journal*, Vol. XVI, No. 3, (1941), pp. 257-6 ; G. Kuriyan, *IGJ*, XVII, (1942), p. 71 ; O. H. K. Spate, *India and Pakistan : A General and Regional Geography*, (London, 1957), pp. 351-54 ; L. D. Stamp, *Asia : A General and Regional Geography*, (London, 1967) ; pp. 274-78 ; R. L. Singh (ed), *India, A Regional Geography*, (Varanasi, 1971) ; pp. 29-40.

3. Delimitation of the Ganga Plains :

A. The Upper Ganga Plain :

The Upper Ganga Plain is one of the three parts of the Great Plains. The problem of delimiting this is relatively more intricate as well as challenging. J. N. L. Baker's[1] two-fold division of the Great Plains into the 'Indo-Gangetic Plain' West and East has been too impractical The limits drawn by Stamp[2] and followed by Spate[3] in their six fold division of the plains from the Lower Indus Valley (West Pakistan) and Brahmaputra Valley (Assam) is also unrealistic. The Allahabad-Faizabad railway line which roughly concides with the 100 m contour as the demarcation between Upper and Middle Ganga Plains, as suggested by R. L. Singh[4] in 1955 and later adopted by S. C. Singh[5] in 1965 has been a better compromise and hence adhered to by us as the eastern limit of the Upper Ganga Plain. In the west, it is demarcated by its counterparts, the semi-arid Punjab Plain and the arid Rajasthan Plain. The region is delimited in the north and north-east by 300 m contour which separates from the Garh-Kum Himalaya and the Nepal. In the South the Yamuna demarcates its border with the Bundelkhand[6]. Thus the region covers more than 51% of the total area of Uttar Pradesh and incorporates within its bounds the Divisions of Meerut, southern parts of Kumaun, Agra, Rohilkhand, Lucknow, Faizabad and Allahabad (excluding Meja tahsil). It is a sub-humid region between the dry Punjab Plain and the humid Middle Ganga Plain. The Ganga and its tributaries, the Yamuna, the Ramganga and the Ghaghara are Himalayan rivers which drain this region all round the year. A host of seasonal streams, notably Hindon, Muskara, Solani, Katha Nala, Krishni and Kali also drain the area. Originally it was covered with moist deciduous forests. The soil is by and large homogenous. Wheat, rice, *bajra* and gram are four crops in order of importance. The Upper Ganga Plain is further sub-divided into two first order regions : (1) The Upper Ganga Plain South and (2) The Upper Ganga

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[1] J.N.L. Baker, *op., cit.*, (1928), pp. 449-454.

[2] L.D. Stamp, *Asia—A Regional and Economic Geography*, (London, 1959), pp. 315-326.

[3] O.H.K. Spate, *India and Pakistan : A General* and *Regional Geography*, (London, 1954), Fig. 13, p. 51.

[4] R.L. Singh, Evolution of Settlements in the Middle Ganga Valley, *N.G.J.I.,I.*, (1955), p. 69.

[5] S.C. Singh, Delimitation of the Middle Ganga Plain, *N.G.J.I.*, XI, (1965), pp. 74-83.

[6] Bundelkhand region comprises Jalaun, Jhansi, Hamirpur and Banda Districts of U. P. Hence these are excluded from the Upper Ganga Plain.

Plain North, taking the Ganga as the main dividing line. These two regions differ both physically and culturally, The Upper Ganga Plain North is relatively less densely populated, urbanized and industrialized than Upper Ganga Plain South. Likewise, rice is relatively more important crop in the former although wheat is the first ranking crop in both.

It is needless to emphasize the role of Ganga not only in giving an individuality to the Upper Ganga Plain but also dividing it into these two regions. Archaeologically also, perhaps, the Ganga has served as barrier to cause differentiation in the nature of ancient human settlements in the two regions. For as known today, the earliest culture in the Lower Ganga Yamuna Doab of the Upper Ganga Plain South is represented by the section of Belan (in Vindhyan Plateau of the District of Allahabad). This section gives us a sequence from the Lower Palaeolithic to the Mesolithic without any break. Several Upper Palaeolithic sites have been also reported in the District of Allahabad. The noteworthy Mesolithic sites of the region are Jamunipur, Kurha. Bichia, Bhikhanpur and Mahrudiha, all in the sub-division of Allahabad. Not only Alamgirpur on the Hindon (in District Meerut) but Baragaon on Muskara (in District Saharanpur) and Hulas on the Katha Nala (in District Muzaffarnagar) are the excavated Harappan sites in the Upper Ganga Yamuna Doab of the Upper Ganga Plain South. Several other Harappan sites have been explored in Saharanpur and on the banks of Katha Nala and Krishni, both tributaries of the Yamuna, in District Muzaffarnagar of this region. The Copper Hoards have been also reported in Bulandshahar, Saipai (Etawah District), Bithur and Sheoraipur (Kanpur District), Pariar (Unnao District) and Pondi (64 km south of Allahabad). The OCP sites are far too numerous in the Upper Ganga Plain South than in the Upper Ganga Plain North. Important among OCP settlements are those of Bahadrabad, Nasirpur, Ambhakheri, Jinjhana, Hastinapura, Atranjikhera, Saipai and Lal Qila. The last terminus station of OCP is the recently excavated site of Sringverapura in District Allahabad. Whether the relationship of the Lal Qila material with OCP is established or not, it is certain that the excavation at the site indicates that the settlers at Lal Qila possess quite a rich cultural assemblage. The data clearly suggests that the people adapted themselves well to the geographical setting of the Upper Ganga Plain South. But at the sametime we cannot forget that settlements like this are noticeably rare. After these there appears the deposit of the black-and-red ware associated with microliths and copper at some sites. The next stage is characterized by the PGW with which begins the first use of iron, *i.e.* Early Phase of Iron Age, and also the first permanent colonization of the region. Even in District Meerut alone we have as many as four settlements of the Early Phase of Iron Age, Hastinapura, Allahapur, Kesari and Alamgirpur. Out of this Hastinapura alone was urbanized in the Late Phase of Iron Age. Meerut even today commands an important position in the highly urbanized zone of the Upper Ganga-Yamuna Doab, enjoying sixth rank among the largest cities of Uttar Pradesh. Hulas in District Saharanpur is another site of Iron Age further north of Meerut. To the south of Meerut are Sonkh and Mathura in District Mathura; Batesvara and Khalaua in Agra; Jakhera and

Atranjikhera in Etah; Kanauj and Kampil in Farukhabad; Jajmau in Kanpur and Bhita, Kausambi and Bhardavaj Asaram in District Allahabad.

The Upper Ganga Plain North, which is further divisible into Rohilkhand Plain and the Awadh Plain, shows a marked decreasing tendency in respect to density of population, urbanization, nature of crops and industrialization. Archaeologically, as noted above, the number of ancient settlements are far too less and diffused in this region than its counterpart region of U.G.P. South. Except a few Mesolithic sites like Sarai-Nahar-Rai, Harhi-Bhituli and Patupur in District Pratapgarh (adjoining the District of Allahabad), we have no other site of the Stone Age culture. The Harappans could not penetrate into this region. The Copper Hoard and OCP sites like Rajpur Parsu (Bijnor District), Bisauli (Badaun District), Ahichchhatra in Bareilly, Dhaka, Sarthauli, Indilapur and Baharia in District Shahjahanpur, Majhadpur in Hardoi, Hardi in Sitapur and Deoti in Lucknow are the only important sites of this region. The black-and-red ware phase is also absent in this region. For the Early Phase of Iron Age we have only Pariar, Sravasti, Sringverapura, Hulaskhera, Manwan and Ahichchhatra in this region. All this hint at the following :

(1) Both these regions, the Upper Ganga Plain South and the Upper Ganga Plain North (first order divisions of the Upper Ganga Plain), show significant variation both geographically and archaeologically. Culturally, perhaps, Ganga was the most important factor which has played the role of the barrier to cause difference in nature and frequency of ancient human occupation in these two regions.

(2) The enormous Ganga Plain is one of the most important and natural sub-division of India. As we have already noted above, its further division based on one master factor is rather not possible. Obviously geographic regionalization[1] based on one or other

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[1] A bold but unsuccessfull attempt to divide the Ganga Plains was made by J. N. L. Baker in the year 1928 who described the whole area as the 'Indo-Gangetic Plain East'. This division was based only on physiography and hence did not find support of O.H.K. Spate. He divided the plains into Upper Ganga Plain and Middle Ganga Plain and said that Baker's treatment of such a large area as one unit does not appear to be reasonable as there is considerable difference between the dry Delhi-Agra region and the wet jute growing part east of the Bihar. Pithawala perhaps incorporating some of the ideas of L. D. Stamp also included Lower Ganga Valley in it. Lyde referred this area as 'Middle Country' of Indo-Aryan Epics and made no effort to divide the whole Ganga Plain into different part. We have followed the regional scheme set forth by R. L. Singh and others in the *India, A Regional Geography*, (1971), which does not include the Sutlej-Yamuna Divide or The Sutlej and the Beas Valley and the States of Punjab, Haryana and the Union Territory of Delhi into the Ganga Plains. They further divide the Ganga Plains into sub-humid Upper Ganga Plain, the humid Middle Ganga Plain and the per-humid Lower Ganga Plain in the east, each merging into the other, rather unaware.

physical factors can be accepted with some justification but they cannot take us much farther in our task. Modern geographers have often not taken cognizance of the fact that it is the culture of man in group which plays the role of the agent to work out the region. Archaeologists on the other hand have been vague and sometimes unrealistic in using the physiographic controlled scheme offered by geographers. B. B. Lal has included all the Copper Hoard sites of these two regions (U.G.P.S. and U.G.P.N.) into Gangetic[1] Basin, although in a later work[2] he is more precise when the described them under the head, 'The Upper Ganga Basin'. The Upper Ganga Basin according to him more or less coincides with the state of Uttar Pradesh[3]. He has not used the other two divisions of the Ganga Plains like the Middle Ganga Plain and the Lower Ganga Plain, although he states very clearly that these artifacts have been also discovered in Bihar and West Bengal[4]. For the description of the same Copper Hoards sites of U. P. and other protohistoric remains at Alamgirpur, Ahichchhatra, Atranjikhera and Hastinapura, Y. D. Sharma uses the term 'The Upper Ganga Yamuna Doab'. Under 'Yamuna Basin' he describes some sites like Sugh, Panipat, Purana Qila, Tilpat and Mathura. The protohistoric remains of Kausambi, Sravasti, Rajghat, Prahladpur, Sohagaura, Sonepur, Chirand and the Vindhyan microlithic and the Megalithic culture comes under his 'Central Ganga Basin'[5]. Subbarao made no attempt to describe the sites of the Ganga Plains under any sub-heads. Sankalia divides the Gangetic basin into three regions, Indo-Gangetic Divide or the Upper Ganga Plain, the Middle Ganges Plain and the Deltaic region. These constitute Delhi, South Punjab, U. P. Bihar and Bengal.[6] So all these terms appears to have been vaguely used and there was no attempt to correlate geography and archaeology. The scheme of delimitation followed by us here coincides with the nature of ancient human occpation also.

(3) The actual boundary drawn in the present scheme between Upper Ganga Plain and Middle Ganga Plain is the Allahabad-Faizabad railway line which is based roughly on the crop combination, density of population and administrative units. This happens to be a much better compromise also archaeologically as will be clear from the following :

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[1] B. B. Lal. 'Further Copper Hoards from the Gangetic Basin and a Review of the Problem,' *Ancient India*, no. 7, (1951), pp. 20, 32 and 38.

[2] B. B. Lal, 'Protohistoric Investigation', *Ancient India*, no. 9, (1953), p. 91.

[3] The Upper Ganga Basin actually covers only about 51% of the U. P.

[4] In the regional scheme followed by us the Middle Ganga Plain covers the Bihar Plains and Eastern Uttar Pradesh and the Lower Ganga Plain includes the Kishanganj tahsil of Purnea District (Bihar) and the whole of West Bengal.

[5] *Archaeological Remains Monuments and Museums*, Part I, (Delhi, 1964), pp. 10-17 and *Ancient India*, no. 9, (1953), p. 116 and 141.

[6] H. D. Sankalia, *The Prehistory and Protohistory of India and Pakistan*, New Edition, (Poona, 1974), p. 5.

(a) Most of the OCP sites are found in the Upper Ganga Plain, the terminus station being the recently excavated site of Sringverapura in District Allahabad. So far we have not found the remains of OCP deposit in the Middle Ganga Plain. Although the excavators have included the site of Sringverapura in the "Central Ganga Valley", they clearly note that it represents the fag end of the OCP culture.[1]

(b) The PGW is the dominant trait of the Early Iron Age of Upper Ganga Plain and does not generally extend beyond Kausambi and Sringverapura in Allahabad, although a few pieces have been reported at Vaisali and recently in 1977-78 also at Katragarh, both in District Muzaffarpur of Bihar. Likewise, NBP, is the distinct trait of the Early Iron Age of the Middle Ganga Plain. From Allahabad westwards it is not so dominant (except at few sites) and wherever reported it is found with PGW.

(c) The tradition of painting black-and-red ware with simple linear designs in white so commonly found on several sites of the Middle Ganga Plain (like Rajghat, Prahladpur, Sohagaura, Sonepur and Chirand) does not extend from Allahabad westwards (except Kausambi where a few painted sherds are reported).

Thus the Allahabad-Faizabad railway line drawn as the boundary between the Upper Ganga and Middle Ganga Plains, in this scheme of delimitation, offers a better compromise and harmony between the geographical factors and the nature of ancient human settlements.

B. The Middle Ganga Plain :

The eastern limit of the Upper Ganga Plain marks the western boundary of the Middle Ganga Plain, while its eastern limit corresponds to the Lower Ganga Plain. As such, it is a transitional region, with no clear-cut-physical unit, as the plain opens up in the west from U. G. P. and imperceptibly merges into the L. G. Plain in the east, It covers the Bihar Plains and Eastern Uttar Pradesh (mostly Purbia Plain), lying on either side of the Ganga and the Ghaghara (Saryu) within the Himalayan and Peninsular ranges on the north and south respectively. So defined, it includes the Divisions of Gorakhpur, Varanasi (including Chakia and Meja tahsils of Varanasi and Allahabad respectively and Mirzapur District), Faizabad and Districts of Sultanpur and Pratapgarh in eastern U. P. and Divisions of Patna, Tirhut and Bhagalpur. The region is more riverine in character and is mainly drained by Ganga, though its regional drainage can be studied by Ghaghara, Gandak, Kosi, Son and other tributaries of the Ganga. Climatically it is transitional in character between the relatively dried U. G. Plain and perhumid Lower Ganga Plain. With a moderate rainfall and fertile soil the region is a habitat of dense forest cover of *Sal* and other species like *Shisam*, *Jamun*, *Mahua* and *Ber* etc. It has a very high density of population but with less urbanism. Rice is the most dominant crop. As in the case of the Upper Ganga Plain, the Ganga is the main divide resulting into two first order divisions : (1) The Middle Ganga Plain North and (2) The Middle Ganga Plain South. The second one is more urbanized with more rail and road accessibility, more irrigation, higher industrialization and with more fertile soil and higher level of economic development.

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[1] B. B. Lal and K. N. Dikshit, 'Sringverapura : A Key-site for the Protohistory and Early History of the Central Ganga Valley', *Puratattva*, no. 10, 1978-79, (New Delhi, 1981), p. 6.

The Magadh Plain of the Middle Ganga Plain South is archaeologically an important region for the Middle Palaeolithic industries at Jamalpur, Bhimbandh and Kandini, all located in the Kharagpur hill range in Monghyr District, have been brought to light. Upper Palaeolithic industries have been reported along the tiny hill range named Daini near Dudhi in Mirzapur[1] District. Similar industry might have been in existence also in Karmanasa Valley in Naugarh area of Chakia tahsil of Varanasi District. Numerous rock-shelters of Mirzapur District, particularly one rock shelter in the Mura hill near village Lahariadih, those located in the hill range lying north of the Son and those in the Saudag forest (around villages Baralia and Kuraila, about 25 km south-east of Robertsganj) have also given evidence of the Upper Palaeolithic tools. The excavation at Morahana Pahar, Baghai Khor and Lekhahia (all in Mirzapur District) have revealed a sequence from non-geometric pre-pottery stage to geometric types associated with pottery.[2] In Varanasi District, .two sites namely, Bankat-Bhikarirampur and Garhwa, belonging to Mesolithic phase, have been reported recently. The rock-paintings of the Mirzapur District, dominated by hunting scenes, relate the story of ancient man from an early time. Only Koldihwa, have given us a store of Neolithic in the Middle Ganga Plain South. But in the Middle Ganga Plain North we have two Neolithic sites viz. Chirand and Chechar-Kutubpur. We have neither Harappan nor OCP nor Copper Hoards[3] sites so far reported in the whole of Middle Ganga Plain, although there is every possibility of the discovery of the Copper Hoards also in the region since they are reported from several places in the Lower Ganga Plain. After this we have chalcolithic sites like Koldihwa and Kakoria (both in M. G. P. South) and Chirand, Sonepur, Chechar-Kutubpur and Sohagaura in Middle Ganga Plain North. The next stage is characterized by the Early Phase of NBP and consequently the

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1 Mirzapur in the strict sense lies in Vindhyachal-Baghelkhand region but since it presents a transitional area between the alluvial stretch of the Great Plains and the Deccan, we have incorporated it in the Middle Ganga Plain.

2. Reported by R. K. Varma, in V. N. Misra and M. S. Mate (ed.), *Indian Prehistory,* (Pune, 1974), pp. 73-75.

3. Copper Hoard sites have been reported in Ranchi, Manbhum and Palamau Districts of Bihar. The Middle Ganga Plain so defined does not incorporate within its bounds the Districts of Ranchi and Palamau. These however, constitute parts of Chotanagpur region. On grounds of Bengali population, Manbhum, now Purulia District is in West Bengal.

Early Phase of Iron Age with which starts the first permanent colonization of the Middle Ganga Plain. Even in Varanasi District we have five settlements of the Early Iron Age, namely Varanasi (Rajghat), Sarai-mohana; Prahladpur, Takiaper and Sarnath. Out of these Varanasi alone was urbanized in the Late Phase of Iron Age. The other human settlements of this phase in the Middle Ganga Plain South are Oriup, Kankarbagh, Apsad, Patna, Rajgir, Champa and Buxar. In the Middle Ganga Plian North, the important sites are Ayodhya, Sohagaura, Chirand, Sonepur, Khairadih, Vaisali, Piprahwa and Ganwaria. Kakoria on the right bank of Chandraprabha in Chakia subdivision of Varanasi District is a Chalcolithic-Megalithic site. There are in the Vindhyas several types of megaliths such as cist with capstone, cist covered by cairn, cairn enclosed by circle, cist of dressed stone with capstone and stone circle with an upright in the centre. These megaliths have no iron in them. To what extent these can be distinguished from the south Indian megaliths needs further work.

The above survey shows that these ancient settlements are larger in number in the M. G. P. South than in the M. G. P. North. This is intimately related to its better alluvial morphology and agrarian economy. The complexities of physical ensembles, viz., geology, drainage, soil, climate and natural vegetation have impact on the selection of ancient sites for habitation. Culturally, here also, as in the case of Upper Ganga Plain, Ganga served as a barrier.

C. The Lower Ganga Plain :

The region extends from the foot of the Darjeeling Himalaya in the north to the Bay of Bengal in the south. In the west it is delimited by edge of the Chotanagpur Plateau and in the east by the borders of East Pakistan and Assam. In the real sense it includes the whole[1] of West Bengal and the Kishanganj tahsil of Purnea District of Bihar. The main streams of the region are Ganga and Brahmputra. It has a hot and humid monsoonal climate. The rainfall is fairly widespread (120 to more than 400 cm) and deciduous and scrub vegetation covers greater part. Rice is by far the most important crop, covering 75% of the net sown area and 85% of the total cropped land. It also accounts for 90% of irrigated area. Jute is the second important cash crop.

Early, Middle and Late Stone Age tools have been picked up from the uplands flanked by river Suvarnarekha and the cliff-sections of various streams in District Purulia. At Susunia in District Bankura a very large factory site of the Early Stone Age was discovered alongwith tools of Middle and Late Stone Ages and a few Neoliths. Districts Burdwan, Birbhum and Midnapur yielded tools of the Early and Middle Stone Ages. In District 24-Parganas also a few tools of the Middle Stone Age were collected. Some Copper Hoard objects were also collected in Purulia District. Identification of chalcolithic black-and-red ware in Districts Birbhum (Mahisdal), Burdwan (Bharatpur and Pandu Rajar Dhibi), Midnapur (Tamluk) and Bankura (Tulsipur) confirmed its wide distribution in the plain. Early Iron Age pottery, chiefly NBP, has been found in sufficient quantity at Mangalkot on the Ajay, Pokkarna on the Damodar, Tamluk on the Rupnarayan, Deuli and Kotasur (in Distt. Birbhum), Bangarh (in Distt. Dinajpur), Districts Calcutta, Malda, Midnapur and 24-Parganas, Megaliths sites have been also reported in District Purulia and Midnapur. Thus the main attracting forces for settlements in the region had been the high banks. In addition to the fertile soil, the sanctity of the Ganga and the Bhagirathi water attracted the human occupance. The region bordering the Chotanagpur Plataeu has relatively more stone age sites. In contrast, the region north of Ganga have rather contributed to the development of a later cultural human settlements.

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[1] The Purulia District of West Bengal (earlier Manbhum of Bihar) were Copper Hoards has been reported is included in this region.

4. Pre-Iron Age Cultures :

It is necessary to give a brief sketch of the prehistoric and protohistoric cultures here in order to mark out their interrelationship and diversity so that the introduction of Iron Age culture in the region at a later stage may be best comprehended. Sir Mortimer Wheeler[1] while departing from India had suggested that "we in India should turn to the Gangetic Valley, for the Ganges had given us our faith, whereas the Indus had given India its name." This suggestion was really prophetic, for the Ganga Plains is now not a *terra incognita* from the prehistoric point of view. Tremendous work done by the Institute of Archaeology, University of Allahabad[2] in the Vindhyan Plataeu and in the Districts of Allahabad, Mirzapur and Pratapgarh have opened a new chapter in the study of the Stone Age in the Ganga Valley. The section of the Belan gives us a sequence from the Lower Palaeolithic to the Mesolithic without any interruption. P. C. Pant, after[3] screening five Middle Palaeolithic sites, namely Parsidhia and Chainpura (of the Belan Valley) and Jamalpur, Bhimbandh and Kandini (all located in Kharagpur hill range in District Monghyr of Bihar), comes to the conclusion that there is distinction between the typical Denticulate Mousterian of Western Europe and Middle Palaeolithic tools found from almost the entire southern Uttar Pradesh. Upper Palaeolithic sites[4] have not only been reported in the Vindhyan region but also in the Districts of Mirzapur, Allahabad and Banda. The blade industry found in the Belan region and also at Banda mostly agreed with that derived from the third gravel of the Seoti river section near

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1. *Ancient India, no.* 5, (Delhi, 1949), p. 10.
2. For details see G. R. Sharma, Stone Age in the Vindhyas and the Ganga Valley published in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), pp. 106-110 and G. R. Sharma, Presidential Address, Indian Prehistoric Society, Delhi, 1975.
3. P. C. Pant, *Prehistoric Uttar Pradesh* (*A Study of Old StoneAge*), (Delhi, 9δ2), pp. 154-155.
4. For details see Radhakant Varma, 'The Upper Palaeolithic Cultures of the Vindhyan Region' and P. C. Pant, 'The Upper Palaeolithic of Southern U. P.', papers read at the seminar on Indian Prehistory, held at Allahabad University, Allahabad in December, 1980.

the village Daiya. Mesolithic phase in the Ganga Valley has been exceptionally rich. The noteworthy sites of the region are Jamunipur, Kurha, Bichha, Bhikhanpur, Mahrudiha in Allahabad sub-division; Sarai-Nahar-Rai, Harhi-Bhituli and Patupur in District Pratapgarh and Bankat, Bhikarirampur and Garhwa in District Varanasi. All these sites are located on the banks of horse-shoe lakes or ox-bow lakes which still control the morphology of the plains and several minor rivers of U. P. have their origin in them. Evidence of human burials have been recorded at Harhi-Bhituli, Kurha and Sarai-Nahar-Rai. The last named site has yielded undoubted evidence of semi-settled life. The open air and rock-shelter sites of Morhana Pahar, Baghaikhor, Lekhahia, Chopani-Mando and Lahariadih have also given evidence of a ceramic industry belonging to Mesolithic period[1]. There is evidence of the migration of the early man from the Vindhyas to the Ganga Plains proper after the formation of the cemented Gravel III around 19715±340 B. P. which continued up to 10345±110 B. P.[2] Recent field work has revealed a large number of primary Neolithic sites out of which Koldihwa, Mahagara[3] and Panchoh, all in the southern part of the District of Allahabad, have been excavated. At a distance of about 3 km from Koldihwa and Mahagara (twin settlements of the Neolithic people) is the site of Chopani-Mando where complete culture sequence from the Epi-palaeolithic to the advanced Mesolithic or Proto-Neolithic has been established. These Neolithic settlements of the Ganga Valley (strictly of the Vindhyan region) now gives an idea of the transformation from the advanced hunting to food production and suggest that there was no nuclear zone from where the idea of food production diffused to other centres. Thapar[4] has proposed three distinctive neolithic zones for Eastern India. e. g. (1) the north-eastern, covering Assam and the neighbouring hill states including Darjeeling District of West Bengal; (2) the central eastern covering Chota Nagpur, eastern districts of Uttar Pradesh, Bihar, Bengal and Assam and (3) the mid-eastern covering District Saran in Bihar. Most of these regions come under the Middle Ganga Plain. The last one in which Chirand is included has given us a wealth of Neolithic material, consisting of both cereal and animal food remains, tools and weapons of stone and bone, settlement of thatched and reed houses with mud plaster and an oven in the kitchen.[5]

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[1] J. N. Pal, 'Ceramic Industry of the Mesolithic Period of the Vindhyas, a paper read at the seminar on Indian Prehistory, held at Allahabad University, Allahabad in December, 1980.

[2] *Radiocarbon Date List*, (March, 1971), Tata Institute of Fundamental Research Bombay.

[3] D. Mandal, 'Neolithic Cultures of the Vindhyas : Excavations at Mahagarh in the Belan Velley', a paper read at the seminar on Indian Prehistory, held at Allahabad University, Allahabad in December, 1980.

[4] B. K. Thapar, 'Early Farming Communities in India', *Journal of Human Evolution*, Vol. 7, (1978).

[5] L. A. Narain, 'The Neolithic Culture of Eastern Indian', in *Essays in Indian Proto-history*, (Delhi, 1979).

Ghosh in 1965, Dales in 1966 and Thapar in 1973 observed that at no Harappan site where there are superimposed post Harappan deposits did the cultures represented by later deposits indicate contact with the Harappans. But the excavations at Baragaon, Alamgirpur, Atranjikhera, Lal Qila, Saipai (all within the Ganga Plains) and Bara, Cemetery-H, Ropar, Dadheri, Bhagwanpura, Mithathal, Daulatpur (all outside the Ganga Plains), have indicated that when the Harappa culture was passing through its later phase, local photohistoric cultures namely, Bara, Cemetery-H and OCP had already come into existence and were thus contemporaneous with it in the later stage. This is demonstrated at Mithathal IIB, Bhagwanpura I and Daulatpur I. This phase is characterized by an amalgam of pre-Harappan, Harappan, Bara, Cemetary-H and OCP ceramic complexes. Deshpande observed that the Harappan Culture in western U. P. has definitely imbibed traits of Cemetery-H, Jhukar and Bara. It has also assimilated some traits of OCP particularly in the upper reaches of the *doab*. The Harappans appear to have given up their burial customs and urban character of the civilization in not witnessed in this region. On the contrary there is a definite rural bias to the settlements and they are by and large, improverished as evidenced by their poor architectural outfit. Added to this is the growing illiteracy, for, pictographs are no longer found. All they appear to know is the continued use of the stone blades and copper implements.[1] There are now definite evidence of the penetration of the Harappa Culture in the Upper Ganga Plain not only at Alamgirpur on the Hindon (in District Meerut) but also at Baragaon on Maskara (in District Saharanpur) and also at Hulas[2] on the Katha Nala (in District Muzaffarnagar). Besides earlier explored sites in Saharanpur by Shankar Nath, K. N. Dikshit has brought to light recently 11 more Harappan sites (ten in District Muzaffarnagar and one in District Saharanpur) on the banks of Katha Nala and Krishni, both tributaries of Yamuna[3]. All these sites, according to him, confirmed the diffusionary stages of the Harappa culture which was spreading with regional variations from Sutlej to Yamuna in the east. Two observation need to be made in this connection : Obviously, in this region of the Upper Ganga Plain one thus meets the last lingering phase of the Harappa culture. One does not know if at all this culture contributed to the subsequent cultures of the region for there seems to be a break of occupation after the Harappa culture. Secondly, the Harappans do not cross the Ganga as their impact was never felt in the Upper Ganga Plain North. After the Harappans the next settlers were the users of the Ochre Coloured Pottery, though their link with the earlier Harappa culture is not yet clear. Most of the Ochre Coloured Pottery sites are found in the Upper Ganga Plain, the terminus station of this region being the recently excavated site of Sringverapura in District

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[1] M. N. Deshpande, 'The Harappan Settlements in Ganga-Yamuna Doab', a paper read at Seminar on the Indus Civilization, Simla, 2nd to 7th Nov., 1977.

[2] K. N. Dikshit, 'The Excavations at Hulas and further Exploration of the Upper Ganga-Yamuna Doab', *Man and Environment*, Volume V, (Pune, 1981), p. 70.

[3] For details see K. N. Dikshit in *Man and Environment*, Volume. V, (Pune, 1981), p. 72 and K. N. Dikshit, The Distribution of Harappan Wares in Gangetic Doab, Annual Conference of the Indian Arceaeological Society, Bhopal, 1980.

Allahabad. So far we have not found the remains of OCP deposit in the Middle Ganga Plain. The association of the OCP either on circumstantial or stratigraphical grounds with Copper Hoards on sites like Rajpur Parsu, Bisauli, Bahadrabad, Nasirpur, Saipai (District Etawah) and Baharia (District Shahjahanpur) has led some scholars to believe that these are the works of the same people. But so far OCP has not been reported from other find zones of Copper Hoards like Plateau areas of Bihar, West Bengal, Orissa, Rajasthan and Kallur (Hyderabad) in the south. Scondly, except at Saipai and Baharia, OCP and Copper Hoards are not found from the same assemblage of other sites of the Upper Ganga Plain. The link of Lal Qila material with what is called typical OCP is in dispute.[1] A fragment of a copper celt found along with quite a rich[2] cultural assemblage of Lal Qila may not belong to the typical Copper Hoard implements. A habitational settlement like Lal Qila is rare. Almost all other OCP sites seldom yield anything except pottery. As noted above, the Copper Hoards have been found, extensively from Upper Ganga Plain to Middle Ganga Plain, Haryana, Rajasthan, Madhya Pradesh, West Bengal, Orissa and also from Kallur in south. Their find-spots are mostly plain fields. Although their tool-pit presupposes good technological skill, the types are mostly made for leading a hunting nomadic life. At none of the sites did these settlements either of OCP or Copper Hoards last for more than a century or so. How and why these settlements came to an end is not clear ? Their relationship with succeeding cultural stages is also not clear. As there seems to be break in occupation after the OCP culture, one is not sure if and in what manner this culture contributed to the succeeding chalcolithic culture of the Ganga Plains. Also we are not in a position to establish any link between the Copper Hoards and the chalcolithic culture of West Bengal for their distribution do not closely coincide.[3]

The real beginning of the colonization of the plains starts with the chalcolithic period. There is definite evidence at present of a permanent habitation stratigraphically underlying the deposit of the Iron Age settlement in the whole of Ganga Plain. Let us see what does the archaeological evidence speak about this chalcolithic culture which immediately precedes the Iron Age settlements marked by the presence of PGW and Early NBP phases. Its one set is represented on some sites of the Middle Ganga and Lower Ganga Plains. Proceeding from east to west the excavated sites are Mahisdal and Pandu Rajar Dhibi in West Bengal; Chechar-Kutubpur, Sonepur and Chirand in Bihar; Sohagaura, Kakoria and Koldihwa in Uttar Pradesh. Prominent among the explored[4] ones are Onaur

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1. Y. D. Sharma comment in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), p.161.
2. R. C. Gaur, 'Lal Qila Excavations and the OCP problem', in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), pp. 154-162.
3. A. K. Nag and Dilip K. Chakrabarti, 'Copper Hoards from West Bengal', *Puratattva* no. 9, 1977-1978 (New Delhi, 1980), p. 99.
4. Information derived from B. B. Misra, 'Chalcolithic Cultures of the Vindhyas and the Central Ganga Valley', a paper read at the seminar on Indian Prehistory held at Allahabad University, Allahabad in December, 1980.

and Unchdih on the left bank of the Ganga, Akahua on river Sai; Pure-Deojani, Belkhwar and Nahusa-Raja-Ka-Tila on horseshoe-lakes. Besides these, Rakhat (Varanasi), Belkhera (Chunar) and Gularihavaghat (Basti), chalcolithic in character, have been also located in the region[1]. Some of the possible lingering traits of this chalcolithic culture has been also noticed even after the introduction of iron in the Early Phase of Iron Age or so called pre-NBP phase (Sub-period IA) of Prahladpur and Rajghat.[2]

The chalcolithic culture of this region is broadly homogenous. The main ingredients[3] of this culture are : wheel thrown black-and-red and black slipped wares occasionally painted with white linear designs; restricted use of copper and stone tools (microliths) essentially belonging to 'short blade industry'; bone points; stable but poor rural settlements with reed-thatched huts with mud plaster and lastly rice and fish as an important element in the diet. The pottery shapes taking all the wares in consideration, comprise bowls (carinated or straight or convex sided or lipped or channel spouted or footed or bowl on stand); legged and perforated vessels; high necked vessels; dish-on-stand and shallow dishes. All these shapes may not be present at every site and certainly not in equal measure. An altogether new trait which was absent in the chalcolithic pottery of the Kakoria and Sonepur is the emergence of paintings on Koldihwa, Chirand, Chechar, Sohagaura and in the last lingering phase of chalcolithic cum the Early Phase of Iron Age of Prahladpur and Rajghat. In Chirand, the paintings has its own pecularity *i. e.* painting in cream over red surface has no place at any other site. Even pottery shapes like dish-on-stand, footed bowl, spout, jug, lota-shaped vessel found at Chirand are absent at Sonepur.[4] This may be due to the fact that Chirand had an earlier beginning. Here the chalcolithic occupation is preceded by Neolithic.[5] At Kakoria microliths occur in abundance but it tend to peter out at almost all the remaining sites. In this connection, V. D. Misra remark that lithic industry on other sites except at Kakoria, was probably a dying force, appears to be correct. At Kakoria the find of a few plain grey were sherds (1.21%) similar in fabric and typology with the black slipped ware, offers another type of variation.

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[1] Explored by the author.

[2] T. N. Roy, 'An Indication of the Chalcolithic Culture, at some sites of Eastern Uttar Pradesh', a paper read at the Seminar on Indian Prehistory held at Allahabad University, Allahabad in December, 1980.

[3] V. D. Misra followed by D. Mandal rightly pointed out the use of black-and-red ware, microliths with crested-ridge blades, familarity with potter's wheel and riverine character of the settlement as some of the unifying factor of this chalcolithic culture. See V. D. Misra, 'Chalcolithic Culture of Eastern India', *The Eastern Anthropologists*, Volume XXIII, No. 3 (1970), p. 241 and D. Mandal, *Radiocarbon Dates and Indian Archaeology*, (Allahabad, 1972), pp. 112-115.

[4] B. P. Sinha, 'Review of the Chalcolithic Cultures in the Ganga and the Vindhyan Valley', a paper read at the seminar on Indian Prehistory at Allahabad University, Allahabad in December, 1980.

[5] Some scholars have expressed their doubt about the Neolithic labelling of Chirand. But now Chirand is not the only Neolithic site in the Ganga Plain. Recently a similar Neolithic deposit has been reported at Chechar-Kutubpur in District Vaisali. Two settlements of the Neolithic people, Koldihwa and Mahagara, situated respectively on left and right bank of Belan in the southern part of the District of Allahabad, are now well known. A Neolithic base in the Ganga Plain is indicated by stray finds of several

We have seven sites now, Bharatpur, Mahisdal, Pandu-Rajar-Dhibi, Chirand, Sohagaura, Koldihwa and Kakoria which provide radiocarbon dates for this chalcolithic culture. The available dates are : TF. 445, TF. 1028, TF. 1029, TF. 334 and TF. 444 from Chirand reading 1650± 100 B.C., 1540±90, 1050±90, 845±125 and 715±105 B.C. respectively; PRL-233 from Koldihwa reading 1440±110 B.C.; PRL-178 and PRL-179 from Sohagaura reading 1330±110 B.C. and 1230±110 B.C. respectively; TF. 391, TF. 392 and TF. 390 from Mahisdal reading 1380±105, 1085±110 and 855±100 B.C. respectively; PRL-15, PRL-187 and PRL-188 from Bharatpur reading 1435±140 B.C., 1180±150 B.C. and 900±150 B.C. respectively and Pandu Rajar Dhibi has two radiocarbon dates, 1260±110 B.C. and 1012±120 B.C. All the dates of Kakoria suffer from modern contamination. None of these above dates are fully qualified for dating either the beginning or the end of the chalcolithic culture of the above sites. In view of the paucity of data it is not possible to check their consistency with the corresponding stratigraphy. However, on the basis of the available information in respect of the above dates, one can at the most place the chalcolithic culture of the region from the later half of the second millenium B.C. to about 800 B.C. This is consistent with the findings[1] of D. Mandal, B. B. Misra and B. P. Sinha. The elements of this chalcolithic culture continue to exist even in the succeeding phase of Early Iron Age. Now on the basis of the terminal date of about 800 B.C. for the chalcolithic culture, a provisional lower limit for the Early Phase of Iron Age or the introduction of iron in this region may be extrapolated. Unlike central India and northern Deccan there is no gap between the end of the chalcolithic occupation and the beginning of the Early Iron Age settlement at any of the sites of this region. Hence the

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Neolithic implements reported from Kanauj to Tamluk. See K. S. Shukla, 'The Neolithic Base of the Culture of the Ganga Valley', a paper read at the Seminar on Indian Prehistory at Allahabad University, Allahabad in December, 1980.

[1] D. Mandal provisionally, though after great precaution, on the basis of ^{14}C dates from Chirand places Bihar chalcolithic culture from *circa* 1600 to 800 B.C. and on the basis of ^{14}C dates from Mahisdal places Bengal chalcolithic culture from *circa* 1100 to 800 B.C. and so according to him the former is older than the latter. B.B. Misra makes a distinction between Koldihwa and Kakoria groups of chalcolithic cultures and places Kolidhwa group from 1500 B.C. to 800 B.C. but thinks that Kakoria group may be slightly earlier than this. See B. B. Misra, *op. cit.*, Allahabad, 1980, unpublished paper. B. P. Sinha in his paper, 'Review of the chalcolithic cultures in the Ganga and Vindhyan Valleys', a paper read at the Seminar on Indian Prehistory at Allahabad University, Allahabad in December, 1980, also assigns 1650—850 B.C. for Chirand and 1100-900 B.C. for Sonepur chalcolithic cultures.

date for the introduction of iron will largely depend upon the terminal date of the former- We have just seen above that the end of the chalcolithic culture can be placed around 800 B.C. If this date is dependable, the introduction of iron and consequently the beginning of the Early Phase of Iron Age in this region may not be later than 800 B.C. This stands corroborated by the following three radiocarbon dates. On the basis of 765 B.C. (TF. 336), 765 B.C. (TF. 186) and 635 B.C. (TF. 376) from Chirand, Prahladpur and Sonepur respectively, belonging to pre-NBP deposit, the initial date of the Early Phase of Iron Age vis-a-vis the terminal date of the chalcolithic culture can also be assigned to *C.* 800 B.C. The problem does not seem to end here for this hurried survey bringes into focus the following points which may have wider implication :

(1) There is no break between the occupation of the chalcolithic culture and the Early Iron Age settlement at any sites of the Middle and Lower Ganga Plains. These two cultures overlap with each other and in fact co-existed for sometime. The so called pre-NBP deposits located at Prahladpur, Rajghat, Chirand and Sonepur, represent this transition phase when the chalcolithic culture was towards the fag end of its career and the iron was emerging. This pre-NBP phase may, therefore, be regarded as the Early Phase of Iron Age in the sense that certain of the elements of the chalcolithic culture were absorbed by it. In fact they went into its make-up. This is coeval with the PGW phase (devoid of NBP) of the Upper Ganga Plain (*Infra).*

(2) A little later in the same Early Phase of Iron Age, NBP, appeared on the scene. This Early Phase of NBP, likely to go back to the beginning of seventh century B.C., represent the time when PGW had almost come to an end and NBP with more iron was emerging in full bloom.

Let us now see what does the recent archaeological evidence tells about the chalcolithic culture in Upper Ganga Plain which precedes the PGW. This is represented by second set of chalcolithic deposit. Proceeding from east to west the important excavated sites are Kausambi, Pariar, Sringverapura, Jakhera and Atranjikhera.

The cultural assemblage at these sites is marked by the presence of wheel thrown black-and-red, black slipped and red wares (all unpainted[1]), simultaneous use of copper and very restricted use of stone-tools (a few microliths has been reported only at Atranjikhera), reed-thatched huts with mud plaster and agriculture and hunting being the main occupation. Some characteristic pottery shapes like bowls, dishes, basins and medium sized vases are available at the above sites. Iron and structures of baked bricks are totally absent.

We have some scientific dates from Sringverapura which help us in dating the chalcolithic culture of this region. As far Sub-period IIA (chalcolithic), there is a radiocarbon date of 2855±200 B.P. *i. e.* 905±200 B.C., which on MASCA correction comes to 960-1010 B.C. From the next higher layer of the same deposit, there are two dates : a thermoluminescence date of 2743±300 B.P. which comes to 793 B.C. and a radiocarbon date of 2700±130 B.P., which on MASCA correction comes to 820-840 B.C. From the earliest layer of Sub-period IIB (later phase of chalcolithic) there are three thermoluminescence dates : 2769±400 B.P., 2690±280 B.P. and 2660±280 B.P., which on conversion comes to to 819, 740 and 710 B.C. respectively. Thus Sub-periods IIA and IIB (chalcolithic) may be placed between 950-800 B.C. and 800-700 B.C. respectively. This is consistent with the date of *circa* 950-700 B.C. proposed by the excavators for Period II of Sringverapura. Since there is no gap between Periods II and III, the beginning of Period III, characterized by the first appearance of PGW and NBP and consequently that of the Early Phase of NBP at the site may be placed around *circa* 700 B.C. These facts bring into focus the following points which may have wider implication:

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[1] The presence of a few painted sherds at Kausambi is only casual.

(1) There is no break of occupation between the chalcolithic culture and the Early Iron Age deposits on any of the sites of the Upper Ganga Plain. These two cultures overlap with each other and in fact co existed for sometime.

(2) At Ahichchhatra, Atranjikhera, Jakhera and Mathura there is an Early Phase of Iron Age which is devoid of NBP but characterized by the presence of PGW. This is coeval with the pre-NBP phase of the Middle Ganga Plain. In this region, this PGW phase is succeeded by the overlap phase of the PGW and NBP or the Early Phase of NBP. This phase is coeval with the Early Phase of NBP of the Middle Ganga Plain.

From the aforementioned brief survey it appears that despite local variations in certain individual traits, the chalcolithic culture or cultures of the whole Ganga Plains are rbroadly homogenous in their cultural contents. In the following lines a short comparative picture of the two regions (Middle-Lower Ganga Plains and Upper Ganga Plain) is given.

(1) All the chalcolithic sites in both the regions are located on the bank of a river, have thin occupational deposit and are poor in cultural assemblage.

(2) Black-and-red and black slipped wares are the dominant ceramic of both the regions. The presence of paintings at some sites is an extraordinary feature of the Middle-Lower Ganga Plains.

(3) Various pottery shapes like bowls, dishes, basins and medium sizes vases are the prominent types of both the regions. Pedestalled or footed or bowl-on-stand is also common in the pottery assemblage of these sites.

(4) Indentical bone points (including arrow-heads) are present on all the sites.

(5) Restricted use of copper is attested and iron is totally absent. While microliths occur in significant number on sites of the Middle Ganga Plain, they are poorly represented in the Upper Ganga Plain.

(6) The structural remains are very poor (except at Kakoria and Koldihwa). The use of wattle and daub is common to both the regions. Structures of baked bricks are totally absent.

(7) There is no break of occupation between the chalcolithic and the Early Phase of Iron Age on any of the sites of these regions. On the other hand the earlier chalcolithic element continue to exist significantly even in the Early Phase of Iron after the introduction of iron. In fact the continuation is so dominant that if we remove PGW and NBP from the Early Iron Phase, it will be difficult to demarcate this phase from the chalcolithic deposit.

(8) The date of the introduction of iron and consequently the beginning of the Early Phase of Iron Age is remarkably similar at all these sites.

(9) In the Upper Ganga Plain on some sites, the Early Phase of Iron Age is devoid of NBP and is characterized by the presence of PGW which is succeeded by the overlap phase of the PGW and NBP or Early Phase of NBP. This PGW phase which is devoid of NBP is coeval with the so called pre-NBP phase of the Middle Ganga Plain. This pre-NBP phase of the Middle-Lower Ganga Plains is succeeded by the Early Phase of NBP.

But what does all this hint at ? Is it one group of the chalcolithic folk occupying the whole Ganga Plains and does the present evidence suggest any movement or penetration of the chalcolithic people from east to west *i. e.* from the Middle-Lower Ganga Plains to Upper Ganga Plain or vice versa ? In this context, B. B. Lal's remark on the chalcolithic culture (Period II) of Sringverapura that, "The culture of Period II, characterized by burnished grey, black-and-red and black slipped wares is evidently a *continuum* of the one dominating western Bihar (e.g. in the chalcolithic levels of Chirand) and parts of eastern U. P. (for example that found at Kakoria). Sringverapura Period II datable to *circa* 950-700 B.C. represents perhaps the last stage of this culture", is significant[1]. However, only extensive and intensive work on the chalcolithic cultures of these regions can answer this question fully well. Whatever may be the truth, it is at least certain that the chalcolithic folk or folks of the Ganga Plains must have thought to change themselves into Iron Age way of life at almost one time-plane for the introduction of iron at all these sites is remarkably similar. In the west, PGW, which had made its appearance in the Early Iron Age continued with less vigour along with NBP, in the Early Phase of NBP, while it moves to eastern region. In the east, within the same Early Iron Age, a little later, NBP with more iron was seen emerging in all its glory. Thus the qualitative changes, the introduction of iron, PGW and NBP, occurring in such a vast area (whole of Ganga Plains) within a short span of time may not have been possible without the impact of some common external or internal force or forces. This question still remains wide open. With this background, in the subsequent chapters, we shall now see in detail what does the archaeological evidence speak about the Early Iron Age (e. g. the PGW and NBP) cultures of the Ganga Plains.

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[1] B. B. Lal and K. N. Dikshit, 'Sringverapura : A key site, for the Protohistory and Early History of the Central Ganga Valley', *Puratattva*, no. 20 (New Delhi, 1981), p. 6.

2

Excavated Sites of Iron Age Culture

1. SITES OF THE UPPER GANGA PLAIN SOUTH (Figure 1)

1. Bhita :

A series of mounds at Bhita lies about 56.32 km downstream from Kausambi in the District of Allahabad.[1] The site was explored earlier[2] but superficially excavated by John Marshall in 1909-10 and 1911-12.[3] The total deposit was divided into five periods ranging in date from pre-Mauryan to Gupta times. Among the antiquities reported were black ware (now called NBP), punch-marked, uninscribed cast, tribal and Kushan coins and several sealings of Kushan and Gupta Periods. Only animal figurines were reported from the pre-Mauryan levels.[4] Marshall has not assigned any burnt brick structure at the site a date earlier than 4th century B.C.[5] "A fine black lustre ware with highly burnished surface was found in company with rough terracotta figures in deposits of the 7-8th centuries B.C. onwards".[6]

Findings :

Irrespective of the method of digging followed by Marshall at Bhita, his observations regarding the occurrence of fine black lustrous sherds (now called NBP) in the deposits of the 7th-8th centuries B.C. and the absence of the baked brick structures at the site earlier than 4th century B.C. are finding support (*Infra*) from recent archaeological excavations. On close examination, his excavations indicate clear distinction between two phases in a deposit, one pre-structural or earlier and the other structural which is decidedly later. So here we get, the remains of the Early and Late Phases of NBP. The Early and Late Phases of the Iron Age are, therefore, covered by Early Phase of NBP or pre-structural or pre-Mauryan and Late Phase of NBP or structural phase respectively.

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1. *An. Rep. Arch. Surv. Ind.*, 1911-12, (Calcutta, 1915), p. 29 ff.
2. For earlier exploration see *Arch. Surv. Ind. Rep.*, III. p. 46 ff; X, p. 5 ff.
3. John Marshall, 'Archaeological Explorations in India, 1909-10; *Jour. Roy. Asiatic Soc.*, (1911), p. 127 ff; *An. Rep. Arch. Surv. Ind.*, 1909-10, p. 40 ff; (1911-12), p. 29 ff.
4. *An. Rep. Arch. Surv. India*, 1911-12, p. 71.
5. *An Rep. Arch. Surv. Ind.*, 1909-10, p. 42.
6. *Ibid.*, p. 42.

2. Kausambī :

The ruins of this extensive site of the Gangetic Valley were identified for the first time by Cunningham.[1] After him a small-scale excavation was conducted by the Archaeological Survey of India in the year 1937-38. Since 1949, the University of Allahabad under G.R. Sharma has excavated the site continuously for several years with encouraging results. The result of the excavations conducted in the year 1949-50 near the Asokan pillar resulted in the discovery of a large number of coins, seals, beads, terracotta and sculptures.[2] The earliest Period I dated from 800-600 B.C. was marked by the occurrence of some sherds of grey ware with painting in black on the rim, above, which after a sterile deposit of 3 m thick, were found 4 m deposit of Period II with large number of NBP sherds and several floor levels. The uppermost occupation of 1 m represents post-NBP deposit of the site. The work from 1951-56 leading to the discovery of the monastery of Ghoshitarama besides other objects, has been published in interim notes.[3] The plan of the monastery was marked by a massive *stupa* roughly square on plan with doubly recessed corners surrounded by chapals.[4] Inside the courtyards were exposed a number of smaller *stupas* and a small shrine of *Hariti*. The monastery marked the place where Buddha preached his sermon and it was described in detail by Hiuen-tsang. The excavator places the first phase of the construction of the main *stupa* to the century after the Buddha's death. The result of the subsequent years' excavation from 1957-59, have been published. This excavation revealed a total of about 18 m of habitational deposit, divided into 25 Structural Periods of which two are pre-defence, twenty-two are coeval with five building periods of the rampart and the last one stands over the ruins of the last defence phase of the city. On the basis of the pottery, these 25 Structural Periods were divided into four major cultural periods which have been named and dated as Kausambi I, *circa* 1165 to *circa* 885 B.C., Kausambi II, *circa* 885 to *circa* 605 B.C., Kausambi III, *circa* 605 to *circa* 45 B.C. and Kausambi IV, *circa* 55 B.C. to 580 A.D.[5] The first four structural periods of occupation, represented by the earliest and first cultural phase of Kausambi and dated from 1265 B.C. to 885 B.C., was marked by the presence of pottery types similar to Navdatoli, Rangpur, Somnath and othe post-Harappan sites in Kathiawar. The early defences, over 9.18 m high, were built of hard rammed clay, having bastions at regular intervals and rivetted externally with baked bricks closely similar to that of the Harappan citadel. Thus the affinity in the

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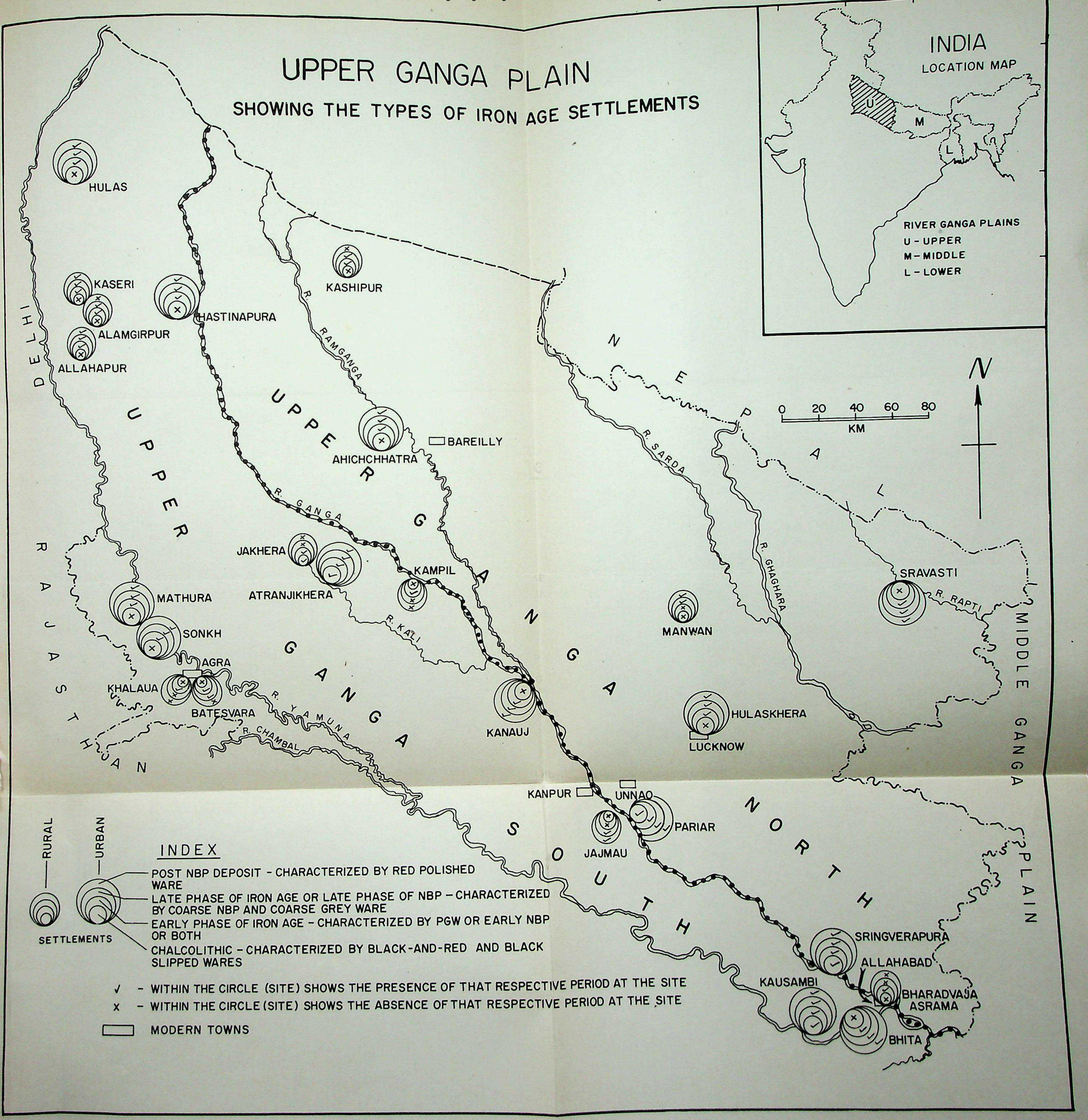
1. *Arch. Surv. Rep.* I, p. 306.
2. G. R. Sharma, *Excavations at Kausambi, 1949-50*, (Delhi, 1969), pp. 16-17.
3. *Indian Archaeology*, 1953-54, *A Review*, (1954), p. 9; 1954-55, (1955), p. 20, 1956-57, (1957), pp. 28-29.
4. *An. Bib. Ind. Arch.*, Kern, Leyden, Vol. XVI, (1958).
5. G.R. Sharma, *The Excavations at Kausambi*, 1957-58, (Allahabad, 1960), p. 22. This culture sequence has been again modified. Kausambi Period I now is to be divided into Periods I and II and consequently Kausambi Periods II, III and IV have to be numbered as KSB III, KSB IV and KSB V respectively. See G.R. Sharma, *Op.Cit.*, (1969), p. XIV.



UPPER GANGA PLAIN

SHOWING THE TYPES OF IRON AGE SETTLEMENTS

INDIA
LOCATION MAP
U
M
L
RIVER GANGA PLAINS
U - UPPER
M - MIDDLE
L - LOWER
N
0 20 40 60 80
KM
HULAS
KASERI
ALAMGIRPUR
ALLAHAPUR
HASTINAPURA
KASHIPUR
DELHI
R. RAMGANGA
AHICHCHHATRA
BAREILLY
N E P A L
R. SARDA
R. GHAGHARA
UPPER
UPPER GANGA
R. GANGA
JAKHERA
ATRANJIKHERA
KAMPIL
R. KALI
MATHURA
SONKH
AGRA
KHALAUA
BATESVARA
R. YAMUNA
R. CHAMBAL
RAJASTHAN
GANGA
MANWAN
SRAVASTI
R. RAPTI
MIDDLE GANGA PLAIN
KANAUJ
HULASKHERA
LUCKNOW
KANPUR
UNNAO
PARIAR
JAJMAU
SOUTH
NORTH
SRINGVERAPURA
ALLAHABAD
KAUSAMBI
BHARADVAJA ASRAMA
BHITA
RURAL
URBAN
SETTLEMENTS
INDEX
POST NBP DEPOSIT - CHARACTERIZED BY RED POLISHED WARE
LATE PHASE OF IRON AGE OR LATE PHASE OF NBP - CHARACTERIZED BY COARSE NBP AND COARSE GREY WARE
EARLY PHASE OF IRON AGE - CHARACTERIZED BY PGW OR EARLY NBP OR BOTH
CHALCOLITHIC - CHARACTERIZED BY BLACK-AND-RED AND BLACK SLIPPED WARES
✓ - WITHIN THE CIRCLE (SITE) SHOWS THE PRESENCE OF THAT RESPECTIVE PERIOD AT THE SITE
x - WITHIN THE CIRCLE (SITE) SHOWS THE ABSENCE OF THAT RESPECTIVE PERIOD AT THE SITE
▭ MODERN TOWNS

FIG. 1

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pottery types of Navdatoli towards the close of the 2nd millennium B.C. points to the same community of culture showing Iranian penetration into Central India. Hence it can be said that this earliest culture at Kausambi may represent the first Aryan immigrants who sacked the Harappans but simultaneously copied the Harappan pattern of defences. The earliest culture of Kausambi, therefore, owes indebtedness to the Harappan culture and to a wave of Aryan immigrants who were probably on the verge of discovering iron, as it was found by the excavator, in association with the earlier phase of rampart. The second cultural period dated from 885 B.C. to 605 B.C. comprising of Structural Periods 5 to 8 was predominated by the presents of Painted Grey Ware and black-and-red ware. The Painted Grey Ware at this site represents a late and decadent stage in the chronological sequence of the ware as compared with other sites as in Punjab, Rajasthan and West U.P. and marks here the second cultural stage before which the defences had already been built. The rampart however, continued throughout this period but the introduction of a moat and the appearance and circulation of coins are noteworthy. The third cultural period demarcated on the basis of pottery and dated from 605 B.C. to 45 B.C., represents the Structural Periods 9 to 16 and was noted by the appearance of NBP, PGW and black-and red ware (this was only present up to SP III-10). Ramparts 2 and 3 also came into existence. The inscribed cast coins of Mitra Kings, lanky bull type, and silver and punched marked coins along with terracotta figurines, were also found in the period. The last group, representing Structural Periods 17 to 25 marks the end of cultural habitation at the site. The pottery was devoid of NBP and the period was dated from *circa* 45 B.C. to 450 A.D. The period witnessed the repair and raising of the rampart and construction of walls and floors. The other cultural equipments do not need any review and are comparable to other sites of the Gangetic Valley. In the excavation which continued at the site from 1960 to 1964, a stone palace-complex covering an area of 315 x 150 m and most probably occupied by king Udayana was brought to light. A complete plan of the structural complex containing tower, hall and various rooms were exposed. It was observed that the palace had three phases. Phase I, yielded pottery-types like the dish-on-stand with a corrugated stem. The other forms resemble with the post-Harappan chalcolithic sites of western and central India. Phase II, was associated with the NBP. The last phase, was dated to *circa* first-second century A.D. The palace has also six post-phases within and on the evidence of pottery and terracottas can be dated between *circa* 200 A.D. and 600 B.C. It was defended by a massive wall on the Yamuna side and by a ditch at the outer side of the northern boundary wall. The ditch showed three structural phases and seems to have been introduced in the NBP Period.

Findings :

Here on the basic sub-stratum of the chalcolithic culture complex[1] of Period I (marked by the presence of black-and-red ware and black slipped ware deposit without iron), there are definite indication of the use of iron from *circa* 1025 B.C.–955 B.C. onward *i.e.* from Structural Period I, 3, onward and consequently the beginning of the Early Phase of

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[1] G.R. Sharma, *Op. cit.*, (1960), p. 58.

Iron. This phase becomes very clear when we examine the cultural equipments of Periods II and III (dated from 885 B.C. to 45 B.C.) which are charaeterized by the the presence of black-and-red ware, PGW, NBP and red ware associates of the PGW level. This phase corresponds with the Early Phase of the Middle Ganga Plain and is coeval with Period III of Sringverapura. The Late Phase of NBP or the Late Phase of Iron Age, however, become clearly perceptible on a closer examination of the NBP deposit (Period III) in the Pillar area. The NBP deposit in this area comprising of layers 16 to 8 have eight sub-periods of habitation. Of these the earlier five are pre-structural (SPI to SPV) and the later three are structural (SPIA, SPIB and SPII). The structural phases represent the Late Phase of NBP or the Late Phase of Iron Age at this site. Period IV dated from 45 B.C. onward is post-NBP. K.K. Sinha[1] and A. Ghosh[2] on the basis of the internal evidence doubts whether there was any pre-NBP deposit at Kausambi ? Also they feel that the antiquity of the site cannot be taken earlier than 600 B.C. In this connection two factors may be considered. Firstly, the beginning of NBP at Sringverapura (on the basis of several Thermoluminescence dates from pre-NBP deposit) has been assigned to *circa* 700 B.C. Secondly, the recognisation of a distinct chalcolithic deposit below pre-NBP levels of certain sites of the Middle Ganga Plain. Since the analogous types referred in pre-NBP deposit of Kausambi occur in a purely chalcolithic context of these sites there is no doubt that this phase indicate, like Prahladpur, the possible lingering remnant of the chalcolithic culture, and the beginning of the Iron Age deposit in the region.

3. Bharadvaja Asrama :

The site was excavated[3] by B.B. Lal and K.N. Dikshit from 1977-78 to 1978-79. Excavation revealed two periods of occupation. Period I, with an average deposit of 1.5 m yielded black slipped, grey war (a few), NBP and associated red ware. A few charcoal bits and lumps of clay with reed impressions are the other find of this period. After a gap the site was reoccupied in Period II during the Gupta times as was clear from the typical Gupta terracotta figurines and a floor paved with baked bricks.

Findings :

The position of iron, exact fabric of the 'grey wares' (whether they belong to the PGW fabric or not ?) and the shape of the NBP associated red ware are not clear. However from the available published notes the assemblage of Period I belongs to the Early Phase of Iron Age or to the Early Phase of NBP.[4]

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[1] K.K. Sinha, 'Stratigraphy and Chronology of Early Kausambi', *Radiocarbon and Indian Archaeology*, (Bombay, 1973), p. 231 and 238.

[2] Personal communication of A. Ghosh to K.K. Sinha quoted in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), pp. 237-238.

[3] Although the site was excavated for two seasons but the interim notes on it has come out only in *Indian Archaeology*, 1978-79, *A Review* (1981), p. 56.

[4] B.B. Lal, 'The Two Indian Epics Vis-A-Vis Archaeology', *Antiquity*, Vol. LV, (1981), p. 32.

4. Jajmau

The site was excavated[1] twice by M. M. Nagar in the session 1956-57 and 1957-58. While digging for laying the National Highway some pieces of PGW and NBP were collected from the site but trial excavation conducted by the U. P. Government and the Archaeological Survey of India in 1973-74 did not yielded any such findings. The site was reexcavated[2] by K.C. Ojha in 1974-75 and by R.C. Singh in 1974-75, 1975-76 and 1976-77. Period I, called Mauryan, yielded NBP, two wells of baked bricks, bone points, vase shaped beads of terracotta, terracotta *dampati*-plaque, uninscribed cast coins, a ivory seal in characters of the 3rd century B.C., nails, arrow and spear heads of iron. Period II, called Kushan Period, showed spurt in structures of baked bricks. Period III was marked by the presence of knife-edge bowls and a few pieces of a glazed ware.

Findings :

Period I on the basis of the finds, corresponds with the Late Phase of NBP and Period II of the site is post-NBP.

5. Kanauj :

It was taken up for excavation[3] for the first time in the session 1955-56 by K. K. Sinha. Prior to this, it was supposed to be an important centre of political activity from seventh century A.D. onward but the excavations have proved that it was in habitation even before *circa* 600 B. C. About 12.23 m occupational deposit has been divided into four cultural periods. Period I dated from 1000 B.C. and later, had no structures but was marked by the presence of a mass of black slipped ware and a sherd of PGW. Period II was dated from 600 B.C. to 200 B.C. on the basis of NBP and associated wares. Burnt brick structures start from this level which continues in profusion in Period III which is post-NBP. From the earliest level of Period III, we get impressed potteries containing symbols of Kushan times. There are seven structural phases, the structures being mostly of burnt bricks but some times of rubble also. The terracotta human figurines are typical. Period IV, on the basis of finds belong to late medieval times.

Findings :

The find of a single sherd of the PGW in Period I ascribable to 1000 B.C. and later is not of much dating value for now we know that PGW have survived even up to 400 B.C.

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[1] *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 22; *I. A.*, 1957-1958, *A Review*, (1958), p. 49.

[2] *Indian Archaeology*, 1974-75, *A Review*, (1979), p. 48; *I. A.*, 1975-75, *A Review*, (1979), pp. 52-53; *I. A.*, 1976-77, *A Review*, (1980), p. 54.

[3] *Indian Archaeology*, 1955-56, *A Review*, (1956), pp. 19-20.

Similarly the date of 600 B.C. given to the beginning of Period II, on the basis of NBP occurring therein, is also on the high side. For the baked brick structures associated with this phase cannot be now placed earlier than 400 B.C. However, Period I on the basis of PGW, mass of black slipped ware and devoid of any structures corresponds with the Early Phase of Iron Age. Period II with baked brick structures and NBP corresponds with the Late Phase of NBP. Period III is post-NBP.

6. Kampil :

K. K. Sinha of the Banaras Hindu University undertook excavations[1] at Kampil in the Session 1975-76 in order to ascertain the limits of the habitation of the PGW people. Accordingly six small trenches were planned for locating the PGW horizon. Exposed sections were also scrapped at several points in the mound. The probings as well as the section scrapings were planned in such a way as to investigate the whole of the mound. The 2.40 m thick deposit belonging to the PGW culture was found resting over the natural soil. In this area, the PGW deposit was overlain with the debris of late medieval period. Several sculptured pieces of carly medieval period have been noticed on the mound. The excavation as well as section scrapings revealed the usual find associated with the PGW culture and these include fine grey ware, black slipped and black-and-red wares. An interesting feature of the excavation was the discovery of a mud embankment with an extant height of 1.70 m. Its basal width cannot be ascertained as the area was on the edge of the mound.

Findings :

The stratigraphic position and the frequency of the typical PGW with painted designs is not clear from the interim published account. The same is the case with NBP. Iron is also not reported from the PGW deposit. From the section scrapings, however, one or two specimens of PGW and NBP were found. The details and purpose of the mud embankment still remains to be ascertained. It has not been related to the stratigraphy of the habitaiion area. However, this defensive measure, from the available meagre evidence appears to have been meant as flood protection device. The sole basis for putting this site among the PGW culture sites are some analogous type of pottery (like fine grey, black slipped and black-and-red wares) and some antiquities (such as terracotta discs etc.) which are hitherto reported from the PGW or the Early Phase of NBP of other sites.

7. Atranjikhera :

It was superfically excavated by R.C. Gaur in the year 1960-62 and subsequently taken up for extensive excavation in sessions 1962-63, 1963-64, 1965-66, 1966-67, 1967-68 1968-69. The result[2] of the excavations are given below :

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[1] *Indian Archaeology*, 1975-76, *A Review*, (1979), pp. 51-52 and Vibha Tripathi, *The PGW, An Iron Age Culture of Northern India*, (Delhi, 1976), p. 140.

[2] For details see *Indian Archaeology*, 1960-61, *A Review*, (1961), p. 35; 1962-63, (1965), pp. 34-35; 1962-63, (1967), pp. 44-49; 1965-66, (1973), pp. 44-47; 1967-68, (1968), pp. 44-46; 1968-69, (1972), pp. 37-38.

Periods I and II are not relevant to the present study. Period III, saw the emergence of iron, PGW and the absence of flake-industry. The black-and-red ware and black slipped ware of the preceding period continued as usual. On the basis of floor-levels and finds, the assemblage has been divided into the two phases, the true-PGW and the late-PGW. In the late phase of the PGW the entire cultural pattern remains the same except that it witnessed the earliest occurrence of NBP. Period IV, which represents an overlap of the PGW and NBP has been also divided into two phases, pre-structural and structural. The ceramic of this period was similar to that of NBP levels of Hastinapura (Period III). But in the earlier phase no definite house-plans could be noticed except the remains of burnt mud clods with bamboo and reed impression. In the late phase, however, mud brick as well as burnt brick structures were found. The pre-structural NBP phase in which the entire cultural pattern of the preceding period continued was brought to an end by a flood. After this the site was fully urbanised perhaps also fortified and showed intense structural activities in the form of brick floors, houses and ring wells etc. The characteristic shapes like carinated *handis,* pear-shaped vases were absent from this pre-structural phase. Periods V, was assigned to Sunga-Kushan.

Findings :

The excavations at Atranjikhera revealed a pre-PGW black-and-red ware phase without iron which can certainly be dated earlier than the beginning of the Early Phase of Iron Age marked by the presence of iron and PGW (Period III). PGW and NBP deposits have been found divided into true-PGW, late-PGW, overlap phase of PGW and NBP, pre-structural and structural phases of NBP. Rarely do we find such a close demarcation of PGW and NBP deposits. The Early Phase of Iron Age is covered by PGW deposit (both true and late PGW), overlap phase of PGW and NBP and pre-structural phase of NBP. The Late Phase of Iron Age by the structural phase of NBP (or the Late Phase of NBP). Period V is post-NBP.

8. Jakhera :

The site was excavated[1] by M.D.N. Sahi in 1974-75 and again in 1975-76. Period I is characterized by unpainted black-and-red, burnished grey, black slipped and red wares, house remains of wattle-and-daub, a hearth, pottery discs, a barrel-shaped bead of jasper and a tanged bone arrow-head. Period II was classified into two phases. Sub-period IIA, an earlier stage of PGW, was marked by the continuation of the pottery of the preceding period along with the introduction of the painted pottery tradition mostly on black on various shades of red. Significant antiquities of this phase are a few pieces of PGW, iron slags and object, bone points and four geometrical terracotta objects. Sub-period IIB, the mature PGW culture, was marked by fine PGW along with plain grey ware (which was absent in the earlier phase), black-and-red and black slipped wares. In this sub-period a part of the settlement was circumscribed by a low mud embankment and a moat. Baked bricks were in use only for ritualistic purpose. Noteworthy antiquities of the phase were antimony rods, large numbers of iron objects, terracotta decorated discs and dabbers, bone points and three terracotta human figurines of black grey colour. Period III was marked by the introduction of NBP but all other pottery of the preceding period including even PGW continued in this. The deposits of this period were thinnest and nothing was noticed in it. After this the site was deserted.

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[1] *Indian Archaeology*, 1974-75, *A Review*, (1979), pp. 43-45; 1975-76, (1979), pp. 50-51, and M. D. N. Sahi, 'New Light on the life of the PGW people as revealed from Excavations at Jakhera, Distt. Etah', *Man and Environment*, Vol. II, (Ahmedabad, 1978), pp. 101-103.

Findings :

Here the PGW deposit is preceded by the black-and-red ware phase (unpainted and devoid of iron) similar to that of Atranjikhera II. The PGW phase (Period II) is devoid of NBP but later on it overlaps with NBP in Period III. Thus in the division of Period III and II much emphasis has been laid on the introduction of NBP. The collective evidence from both these periods like the find of iron objects (right from the start of the PGW phase or Period II), terracotta discs, bone points, antimony rods and finally the overlap of the PGW and NBP show that they correspond with the Early Phase of Iron Age. The occurrence of baked bricks, although for ritualistic purpose, in this period is a evidence of new kind. The Late Phase of Iron Age or the Late Phase of NBP is conspicuous by its absence.

9. Khalaua :

The mound, about 200 m south-west of the village Khalaua, is situated under the Son-Kheri rivulet (which is extinct now), probably a tributary of the Khari-Nadi, in village Khalaua, 16 km from Agra. It was explored by J. P Gupta and superficially excavated by Y. D. Sharma in the session 1965-66[1]. The excavation revealed that it was an one period site having an occupational deposit of 3.45 m thick. It was characterized by PGW, black-and-red ware, black slipped ware, plain red ware, a bone arrow head, a copper bangle piece, an ivory disc, beads of terracotta and carnelian and a terracotta human head. A mud-brick flooring or platform, measuring 1.5 x 1 m was the only evidence of structure. The site was poor in finds.

Findings :

Unlike Atranjikhera, Jakhera, Noh and Jodhpura, no separate horizon of the black-and-red ware deposit was found, although the three exploratory soundings made at the site were done only with this view. The Early Phase of Iron Age is marked by the presence of PGW, black-and-red, black slipped and a piece of NBP[2] in the upper levels of this deposit. There are no indication of the deposit of the Late Phase of Iron Age or Late Phase of NBP. The site being small, compact and having maximum occupational debris of 5 m, if excavated

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1. *Indian Archaeology*, 1965-66, *A Review*, (1973), pp. 41-42.
2. NBP sherd has not been reported in the description found in *Indian Archaeology*, 1965-66 but Y. D. Sharma while commenting in the seminar on NBP held at Delhi in 1971-72 (See *Puratattva*, no. 5. p. 33) mentioned that a single sherd of NBP was found in the upper horizon of the PGW levels at Khalaua,

horizontally, may prove very useful in determining the details of the Early Phase of Iron Age of the Upper Ganga Plain.

10. Batesvara :

The site lies in District Agra and was excavated[1] by J. S. Nigam in 1974. The excavations revealed a sequence of four cultural periods. Period I was characterized by PGW, black-and-red, black slipped and red slipped wares. In red ware the incised decoration was very common. Terracotta discs, skin-rubbers, vase shaped beads, bone points, copper and iron objects were the other finds of this period. In Period II NBP and thick grey ware were introduced. Terracotta discs, skin-rubbers and bone points continued to occur. Structures of both mud brick and baked brick were noticed. A ring well, an oven, collyrium sticks, a carved jewel box of bone, coins and iron objects were the other finds. Period III dated from 1st century A. D. to 6th century A. D., was marked by the presence of Red Polished Ware, two ring wells and a well of baked bricks. Period IV belongs to Rajput Sultanate Period.

Findings :

Here the two phases of the Iron Age are very clear. The Early Phase of Iron Age is marked by the presence of iron, PGW, black-and-red, black slipped ware, terracotta discs and bone points etc. In the Late Phase of Iron Age we find NBP, coarse grey ware, baked brick structures, ring well and coins etc. Here NBP is in its late context. Period III is post-NBP.

11. Mathura :

A small-scale excavation of the site was taken up by M. Venkataramayya and Ballabh Saran in 1954-55. But its extensive excavation was taken up by M.C. Joshi and C. Margabandhu under the general supervision of B. K. Thapar from 1973-74 to 1975-76. Consequently this resulted in the modification of periodization[2]. Period I (*circa* 6th century B. C. to the closing decades of the 4th century B. C.) was divisible into two Sub-periods IA and IB. Sub period IA, was marked by the presence of PGW, black polished ware, black-and-red ware and red ware. Other finds include terracotta discs (both plain and decorated), a bone arrow-head, two broken bone styli, a terracotta amulet and a fragment of a conch. A mud-platform and a floor with post-holes were the structural remains. Sub-period IB did not show any major change in pottery except that seventeen sherds of NBP were encountered. In the PGW, however, some new designs were noticed. The ceramic of Period II consisted of NBP and its associated wares, besides plain grey ware. Ring wells of 55 to 90 cm diameter, soakage jars, several mud platforms, mud floors (of which one had rows of post-holes) and circular pits were the structural remains. In one of the mud platform the use of baked bricks was seen. Noteworthy finds of this period include : a punch-marked coin of copper, bone points, a spear-head of iron, beads of semi-precious stones and terracotta animal and human figurines in grey. Period III marks the Late Phase of NBP in which ring wells and large number of structures of baked bricks were noticed. Period IV yielded antiquities belonging to Saka-Kushan times. In Period V no significant object was recovered except a few floors of mud and brick-bats and a sealing.

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[1] *Indian Archaeology*, 1975-76, *A Review*, (1979), pp. 42-43.

[2] For details see *Indian Archaeology*, 1954-55, *A Review*, (1955), pp. 15-16; 1973-74, (1979), pp. 31-32; 1974-75, (1979), pp. 48-49; 1975-76, (1979), pp. 53-55.

Findings :

Here the two phases of the Iron Age are well demonstrated. Period I (Sub-periods IA and IB) with PGW, black-and-red, black slipped, NBP, bone points and terracotta discs etc., corresponds with the Early Phase of Iron Age (although position of iron in this period is not clear). Periods II and III corresponds with the Late Phase of Iron Age as it is marked by the presence of NBP, structures of baked bricks, ring wells and coins etc. Period IV, which yielded antiquities belonging to Saka-Kushan time, is post-NBP.

12. Sonkh :

The site lies about 30 km south-east of Mathura city. Although it was excavated[1] by H. Haertel of the Berlin Museum of Indian Art from 1966-67 to 1972-73 but the work of only field seasons 1966-67 and 1972-73 threw some light on the topic relevant to our present studies. In the pre-Mauryan phase, PGW and black-and-red ware belonging to *circa* 600 B. C. have been reported. In this phase lumps of iron slag also occurs. In Phase II, NBP is accompanied by coarse grey ware, Mauryan terracotta mother Goddess and an uninscribed cast coin. The baked brick phase occurs after *circa* 100 B. C. The site has yielded lot of material of Kushan Period.

Findings :

The Early Phase of Iron Age corresponds with pre-Mauryan phase of the site in which PGW, black-and-red ware and iron slags are reported. Phase II with NBP, coarse grey ware and a coin represents the Late Phase of Iron Age and consequently the Late Phase of NBP. Structures of baked bricks occur only upward round about 150 B. C.

13. Hastinapura :

The site was excavated by B.B. Lal[2]. The excavations revealed five periods of occupation with a distinct break in between all. The earliest, Period I (pre-1200 B. C.), was marked by the presence of OCP with which we are not concerned. The second cultural period, (Period II) dated from 1100 B.C. to 800 B.C., was represented by PGW, black slipped ware, black-and red ware and red wares. Although a fragmentary baked brick occurred in the upper levels of this deposit, the people built their houses of mud and mud-bricks. They used mud plaster with reed-impression and practised agriculture and cattle breeding. Copper was more commonly used than iron. The copper objects include arrow-heads, a nail pairer, a borer (?), an antimony rod and a number of broken objects. Lump of iron slags and ore were recorded from the upper levels. But during the excavation of 1962, certain finished iron objects like pins, nails and knife-blades were found from the mid-level of this period. Skeletal remain of horse, rice and the terracotta discs are the important finds. After about a gap of 200 years, a town sprang up here afresh, a characteristic pottery of which was the NBP and its associated wares. The people of this culture (Period III) were more advanced than their predecessors as they used burnt brick structures, terracotta ring wells and brick drains. Iron was regularly used and money also came into circulation in the form of punch-marked and uniscribed cast coins. Other finds of this Period III, dated from early sixth to early third century B.C., were terracotta figurines of animals like elephants, lions (?), horse and human figurines with elaborate head dress and ornaments. Beads, glass bangles and rings made of copper, chalcedony and horn and a terracotta disc were the other collections. About 250 B.C. this entire township was destroyed by a huge fire, which has left its scar over a large area. The site was reoccupied for the fourth time in (Period IV) about 200 B.C., after a temporary break of about 100 years and continued upto the end of 3rd century A.D.

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[1] *Indian Archaeology*, 1966-67, *A Review*, (1975), pp. 41-43; 1968-69, (1971), p. 40; 1969-70, (1973), pp. 42-43; 1970-71 (1974), pp. 39.40; 1971 72, (1975), pp. 47-48; 1972-73, (1978), pp. 34-35.

[2] B. B. Lal, 'Excavation at Hastinapura and other explorations in the Ganga and Sutlej basins', *Ancient India*, nos., 10 and 11, (1954 and 1955), pp. 5-138.

Findings :

Since the publication of Hastinapura report in 1954-55, several important factors have come to light. The two contexts of NBP, radiocarbon dates of NBP and PGW, overlapping of PGW and NBP on several sites, the occurrence of not only slag but finished[1] iron objects in PGW level, a phase of black-and-red ware immediately preceding the Early Phase of NBP on sites like Prahladpur and Rajghat, a phase of black-and-red ware immediately preceding the PGW phase on sites like Atranjikhera, Noh and Jodhpura and finally an indication of non-iron phase of PGW at Bhagwanpura and other sites beyond the Ganga Plain.

If we try to project the PGW and NBP cultures of Hastinapura in the recently worked out phases of PGW and NBP, in the light of the above factors, the picture will be as follows. Period III of Hastinapura on the basis of various cultural equipments like less number of NBP, coarse grey ware, structures of burnt bricks, ring wells, drains, coinage, carinated *handi* and pearshaped vessels in red ware (Ahichchhatra 10A) etc., represents the Late Phase of NBP. Period II, is coeval with the Early Phase of NBP as the red ware shapes associated with the Early Phase of NBP at Sravasti are similar to those found with the PGW at Hastinapura. The cultural material associated with PGW deposit of Hastinapura (Period II) like terracotta discs, nailparers, glass bangles, copper borers and iron also show a remarkable similarity with the Early Phase of NBP of Sravasti, Period I *(Infra)*. Similar evidence has also been found at Atranjikhera IVA, Noh III, Jakhera III, Sugh IA, where not only there is a overlap of PGW and NBP but the associated assemblage is similar with Sravasti I and Hastinapura II *(Infra)*. The pre-NBP phase is absent at Hastinapura and is probably covered by the gap in between PGW and OCP. Consequently the Early

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[1] N. R. Banerjee reexcavated the site in 1962 and reported several finished iron objects in the PGW levels of Hastinapura. See N. R. Banerjee, *The Iron Age in India*, (New Delhi, 1975). p. 216.

Phase of Iron Age is covered at the site by the PGW deposit *i. e.* Period II and the Late Phase of Iron Age by the Late Phase of NBP *i, e,* by Period III.

14. Allahapur :

The excavation of the site was taken up in the session 1970-71 by Romila Thapar of the University of Delhi and K. N. Dikshit of the Archaeological Survey of India. The excavation[1] revealed a total deposit of 2 8 m divisible into two cultural periods. Period I, was further divisible into Sub-periods IA and IB. IA, was marked by the presence of plain black-and-red ware, PGW, black slipped ware and red ware. In the early level of this phase, (the total thickness of this phase is about 1 m` plain black-and-red ware predominates but in the upper levels, PGW dominates and black-and-red ware decreases. The shapes in both these wares were same. The black slipped ware was very restricted in quantity while the associated red ware types are mainly those which are reported from the PGW levels of Hastinapura. Iron, terracotta and bone objects augmented the material equipment. Since the objects of bone and antler were large, a detailed techno-typological study was made by Dikshit elsewhere.[2] Structural remains were found in the form of closed and open-mouthed hearths, mud floors with post-holes and burnt reed-impressed mud plaster. Charred bones along with horns were also found. In Sub-period IB, all the wares of the preceding phase continued except black-and-red ware. The PGW continued to remain as usual and did not show any degeneration either in fabric or in paintings. Although no NBP was found but the phase was marked by the presence of some of the basic traits of the NBP assemblage such as burnt brick, discs, iron objects like spear-head, arrowhead, blades etc., beads, copper nail-parer, awls, kohl-sticks, bone points, stone querns and pestles. The red ware types such as bowl-cum-lid, basin, deep bowl and jars were of Hastinapura NBP affinity. An inscribed terracotta seal, palaeographically, assignable to the late Mauryan character reading 'Bhadrapalasa', was reported from the upper levels of this phase. The use of baked-bricks of different sizes (33 x 16 x 5.5 or 39 x 19.5 x 5 cm) with rice husk as a degraissant was noticed. Remains of a few mud walls, a circular mud walled room containing some hearths, burnt floors, post-holes and also baked bricks were the other structural remains. Period II, the remains of which were, very flimsy in nature, was marked by the the presence of a painted red ware assignable to the early Christian era.

Findings :

Here the two phases of the Iron Age are also clear. Sub-period IA represents the Early Phase of the Iron Age in which we get black-and-red, black slipped, PGW, iron and red ware assemblage of Hastinapura II. Thus it is coeval with the PGW phase of Hastinapura except that in the early layers of Sub-period IA there is a preponderence of black-and-red and black slipped wares. This fact, however, provides an link with the separate phase of black-

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1. *Indian Archaeology,* 1970-71, *A Review,* (1974), pp. 40-41; K.N. Dikshit in *Radiocarbon and Indian Archaeology,* (Bombay, 1973), pp. 148-153.
2. *Puratattva,* no. 1970-71, pp. 51-55. In *Prahladpur Excavation Report of* 1968, a detailed typological study of the bone points has also been made.

and-red ware noticed at other sites like Atranjikhera, Jakhera, Pariar, Noh and Jodhpura. Sub-period IB contains all the basic traits of the Late Phase of NBP and consequently that of the Late Phase of Iron Age. The continuation[1] of PGW without any degeneration in fabric and painting in this phase *i. e.* up to *circa* 300 B.C. and the absence of NBP from this deposit are new features of the site.

15. Alamgirpur :

Its importance as the probable station of the Harappa culture within the Ganga-Yamuna doab was realized by Y.D. Sharma when he examined the material unearthed by the Regional Bharat Sewak Samaj Committee camping at the site in May, 1958. Subsequently he undertook the work and his excavation[2] revealed four cultural periods, the earliest, belongs to the Harappa culture. After a definite break, the site was reoccupied in Period II by a people using PGW, black-and-red ware, black slipped ware and plain red ware. Among terracotta figurines, the animals were beautifully finished with incised strokes. Besides copper, iron was also present. Among other finds, mention may be made of dice, styli, pins, arrow heads of bone, small reel-shaped discs of black jasper and glass beads. Except a fragmentary mud wall no structure was noticed. Due to the occurrence of iron, low percentage of PGW and certain pottery types associated with the NBP deposit, the excavator called this Period II, as representing the late phase of the PGW culture. The average thickness of this deposit was 1.37 m. Period III, again after a gap, was characterized by unlined soakage well, kiln burnt bricks of two sizes 31.8 x 31.8 x 9.5 cm and 47.7 x 31.8 x 9.5 cm and potteries of the early historical period. The average thickness of this deposit was less than 30.5 cm and that too was confined to only certain portion of the site.

Findings :

Period II with black-and-red, black slipped, PGW, bone points, structures of mud wall and iron corresponds with Period II of Hastinapura and consequently with the Early Phase of Iron Age. Period III with pear-shaped vases, carniated cooking *handi*, ring wells and burnt brick corresponds with Period III of Hastinapura and consequently with the Late Phase of Iron Age. Like Allahapur here also we do not get a single sherd of NBP in the Late Phase of Iron Age.

16. Kaseri :

It was excavated in the year 1969-70 by Romila Thapar and K. N. Dikshit of the University of Delhi and of the Archaeological Survey of India respectively. The excavation[3] revealed 3.5 thick strata divisible into six cultural periods ranging in date from about 1500 B.C. to the early medieval times. In Period I, except OCP nothing was reported. Period II, was characterized by PGW, black-and-red ware, black slipped ware and associated plain red ware. Beads and balls of terracotta and oval-shaped hearth were the only other finds. According to their estimate, the site was occupied towards the late phase of the PGW culture. In Period III, not a single sherd of NBP was found. On the other hand, it was marked by the presence of the plain grey ware of thicker fabric and other associated objects, the details of which have not been reported. Period IV, was dominated by red wares assignable to the early centuries of the Christian era along with only a few baked bricks having finger marks on them.

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[1] Recently B.B. Lal has questioned the continuation of PGW at Allahapur up to the Mauryan times. See B.B. Lal in *Puratattva*, no. 9, 1977-78, (New Delhi, 1980), pp. 64-80, and reply given by K.N. Dikshit in the same volume at pp 81-83.

[2] *Indian Archaeology*, 1958-59, *A Review*, (1959), pp. 50-55.

[3] *Indian Archaeology*, 1969-70, *A Review*, (1973), p. 43.

Findings :

The site is very poor in the yield of the antiquities. Its Period II, (PGW phase) corresponds with the Early Phase of Iron Age and Period III is covered by the Late Phase of Iron Age. Here also like Allahapur and Alamgirpur we do not get a single sherd of NBP in the Late Phase of Iron Age. Period IV is post-NBP.

17. Hulas :

The site situated in Nakur Tahsil of the District Saharanpur, was excavated[1] by K.N. Dikshit in 1978-79 and 1979-80. Period I indicated the remains of the Harappa culture. Period II by PGW culture. This period yielded PGW, plain grey, black-and-red, black slipped and associated red wares, bone points, iron slags, antimony rods, terracotta disc and *ghata*-shaped beads of terracotta. A strap-handle in black ware and a bowl with a flat disc base in PGW was a new variety. A mud floor with post-holes was also found. Period III was represented by the deposit in which besides a few NBP, black slipped ware, grey ware, the associated red ware comprised of Ahichchhatra 10A and carniated *handi*, wedge-shaped bricks and elliptical hearth, represent the structures of the period. Period IV was represented by Sunga-Kushan and Period V from Gupta to early Medieval times. The overlap between Periods II and III (*i.e.* between PGW and NBP deposits) was noticed.

Findings :

Here the Early Phase of Iron Age corresponds with Period II *i.e.* the so called PGW culture. There are, however, no indication of any pre-PGW, black-and-red ware phase. On the other hand there are clear indication of the overlap of the PGW and NBP deposits. The people of the Early Phase of Iron Age did not occupy the deserted portion of the Harappans and settled right on the natural soil. Period III which overlapped with the PGW deposit in the earlier levels does indicate that there is an Early Phase of NBP which is not well recognized at the site. However, on the basis of other cultural equipments like Ahichchhatra 10A, carinated *handi* and structures of baked bricks it corresponds with the Late Phase of NBP. Period IV is post-NBP.

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1. K.N. Dikshit, 'The Excavations at Hulas and Further Exploration of the Upper-Ganga-Yamuna Doab', *Man and Environment*, volume, IV, (Pune, 1981), pp. 70-72, and *Indian Archaeology*, 1978-79, *A Review*, (1981), pp. 60-61.

2. SITES OF THE UPPER GANGA PLAIN NORTH (Figure 1)

18. Sringverapura :

The site is being excavated since December, 1977 as a part of the National Project, 'Archaeology of Ramayana Sites'. The work being carried out under the joint auspices of the Indian Institute of Advanced Study, Simla and the Archaeological Survey of India. The result of the excavations are summarized[1] below :

Period I dated from *circa* 1050-1000 B.C., represents the fag-end of the Ochre Coloured Ware culture. After this there is a short break in occupation. Period II, dated from *circa* 950 B.C. to 700 B.C., was characterized by black slipped, black-and-red, burnished grey and associated red wares. This period is sub-divided into IIA and IIB, the former being marked by the dominance of coarse black-and-red and burnished grey ware, which tend to peter out in IIB. Bonepoints, a barbed bone arrow-head, a bone pendant and beads of terracotta, jasper etc. and one of gold are the antiquities recovered from this period. This deposit represent the last stage of the chalcolithic culture found at Chirand (western Bihar) and Kakoria (eastern Uttar Pradesh). Period III, dated from *circa* 700-250 B.C., is divisible into three Sub-periods IIIA, IIIB and IIIC. In Sub-period IIIA, NBP is introduced and it is found in great number and variety. Along with this, black slipped ware and a few sherds of PGW are also found. In Sub period IIIB, the miniature bowl, Ahichchhatra 10A, and carinated *handi* made their appearance. The presence of structures of baked bricks was not very clear in this phase of NBP. In Sub-period IIIC, burnt-brick structures are found and the quality as well as the quantity of NBP was on the wane and coarse grey ware became prominent. The important antiquities of this Period III include three copper vessels, a long-handle laddle, terracotta female figurines (Mauryan) and balls, bone points, copper and iron objects and uninscribed cast and punch-marked coins of silver and copper. Period IV, dated from 250 B.C. to A.D. 200, is divisible into two sub-periods. In this period NBP and grey ware was not found but red ware was the only industry. In Sub-period IV, a coin of Lanky Bull type, coins of the rulers of Ayodhya and Sunga terracottas are worth mention. To IVB, belongs a massive burnt-brick tank of two units. Periods V, (dated from 300 A.D.—600 A.D.), VI (dated from A.D. 600 to 1300 A.D. , and VII (dated from A.D. 17th—18th century) are not of relevance in the present context.

Findings :

This site for all practical purposes has been included in the Middle Ganga Plain but we would prefer to place it in the Upper Ganga Plain as the site is the terminus station of the OCP culture, the PGW does not extend east of it and there is an unpainted black-and-red ware deposit in the pre-PGW-NBP horizon.

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1. For details see *Indian Archaeology*, 1977-78, *A Review*, (1980), pp. 54-56. B.B. Lal and K.N. Dikshit, 'Sringverapura, 'A Key site for the Protohistory and Early History of the Central Ganga Valley', *Puratattva*, no. 10, 1978-79, (New Delhi, 1981), pp. 1-7 and *Indian Archaeology*, 1978-79, *A Review*, (1981), pp. 57-59.

Here like Atranjikhera and Jakhera there is an unpainted black-and-red and black slipped wares deposit devoid of iron below the Early Phase of NBP (Sub-period IIIA). This Early Phase of NBP in which a few PGW sherds are also found corresponds with the Early Phase of Iron Age (although iron is not reported from Sub-period IIIA) of the Middle Ganga Plain. It is thus coeval with the PGW phase of the Upper Ganga Plain. Sub-periods IIIB and IIIC in which miniature bowl, Ahichchhatra 10A, carinated *handi* and the coarse grey ware became preponderant and NBP was found in less number, represent the Late Phase of NBP. However, the presence of baked brick structure (another diagnostic trait of the Late Phase of NBP) in Sub-period IIIB was not clear but they are definitely found in Sub-period IIIC. It is noteworthy that NBP at the site did not continue after 250 B.C. (as it did on some other sites of the Ganga Plains) as Period IV dated from *C.* 250 B.C. to A.D. 200 was notable for only red ware industry and there being no NBP or the coarse grey ware.

19. Pariar :

The site lies in District Unnao and was excavated[1] by B.B. Lal and K.N. Dikshit in the year 1978-79. The lowest levels yielded Ochre Coloured Pottery. The next 40 cm thick regular stratum yielded black-and-red, black slipped and associated red wares besides terracotta discs, beads, bone points and copper objects. The succeeding deposit of 30 cm was characterized by PGW, *ghata*-shaped beads, terracotta disc, bone points and a series of postholes in the form of structural activity. The next period characterized by NBP overlapped with the preceding period with PGW. In the late levels of this NBP Period were found miniature bowls, Ahichchhatra 10A, carinated *handi*, brick-kilns and a terracotta ring well. The last period was that of the Sunga-Kushan which was flimsy in deposit.

Findings :

Here the Early Phase of Iron Age corresponds with the PGW deposit and the overlap phase of the PGW and NBP. In the NBP deposit there are clear indication of the two phases. The Early Phase of NBP corresponds with the overlap phase of PGW and NBP and in the Late Phase of NBP, antiquities like miniature bowls, Ahichhchatra 10A, carinated *handi*, ring well and baked bricks occur. The last period is post-NBP. Here like Hulas, the Early Phase of NBP is not well recognized though indicated. The pre-PGW phase of the black-and-red and black slipped wares perhaps represent the last lingering deposit of the chalcolithic culture.

20. Hulaskhera :

The site lies in District Lucknow and was excavated by R.C. Singh in 1978-79 (*I.A.*, 1978-79, pp. 74-75). Period I dated from *circa* sixth century B.C. to second century B.C.

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[1] *Indian Archaeology*, 1978-79, *A Review*, (1981), pp. 61-62, and B.B. Lal and K.N. Dikshit, 'Pariar—An Eastern Outpost of the PGW Culture', a paper read at the Indian Archaeological Society Conference held at Waltair from 29th to 31st December, 1981.

was marked by the presence of NBP, black-and-red and black slipped wares (which was found in the lowest deposit of 80 cm). The other antiquities were *ghata*-shaped beads, bone awls, tanged arrowheads, ivory beads and terracotta animal figurines. Period II dated from *circa* second century B.C. to second century A.D. was characterized by the occurrence of structures of baked bricks of which three phases were noted. The third phase belong to Kushan Period. NBP and black slipped wares continued to occur in the early phase of the period. The other noteworthy antiquities of this Period II were antimony rods, vase shaped beads, flesh-rubber, potter's stamp, bone alws, punch-marked coins and coins of Vima Kadphises, Kanishka and Huvishka. Period III dated from *circa* third century A.D. to fifth century A.D. belongs to Gupta Period.

Findings :

Period I with NBP, black slipped, black-and-red wares, *ghata*-shaped beads, bone points (including arrowheads) represent the Early Phase of NBP and consequently the Early Phase of Iron Age (although iron is not reported from this period). The early two phases of Period II with NBP, structures of baked bricks, punch-marked coins etc. represent the Late Phase of NBP. The third phase of Period II belonging to Kushan Period is post-NBP. Iron is also not reported from the Late Phase of NBP.

21. Sravasti :

Its first systematic excavation[1] was taken up by K. K. Sinha in 1958-59. It revealed the following results. Period I, which represent pre-defence habitation with an average thickness of 1.52 to 1.93 m was found over the natural soil, the yellow sandy loam, struck at a depth of 6.42 m from the highest point of the mound. It is characterized by NBP in prolific number and other associates like black slipped ware, black-and-red ware, plain grey ware, plain red ware and several varieties of the painted wares, including even PGW. The black slipped ware, PGW and several shapes in plain red ware were not different in fabric and shape from the similar wares recovered from Hastinapura II and Rajgir II. No coins were recovered nor any structures were met with. A series of post-holes, however, were noticed but whether they belonged to this period or the succeeding was difficult to ascertain. A feature of the deposit of this period was the presence of pits filled with lumps of burnt logs and fine pottery including complete shapes. These pits might have served some special purpose other than common refuse pits. Other finds of the period were 'eye-beads' of stratified glass and agate, a cylinder bead of lapis lazuli, leech-shaped beads of agate, axe-amulet of carnelian, terracotta animal figurines bearing incised grooves, terracotta discs bearing sun and *svastika* symbols; bone points and translucent glass bangles of sea-blue and light green colour. Copper bangles, ear-rings, pins and borers some of them with well developed skill in smithy shows that copper was more popular than iron. This period was assigned a date-bracket of *circa* 600 to 300 B.C. After no appreciable time gap, Period II, started with a marked improvement over the preceding one. The pottery was mainly of red wares and coarse grey ware and was exclusively utilitarian.

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[1] K. K. Sinha, *Excavations at Sravasti*, 1959, (Varanasi, 1967).

Moulded figurines made their appearance of which elephant was the most popular. Special beads of glass and beads of amethyst and crystal were locally manufactured. Iron was more used than copper. Bone points, uniuscribed cast coins, punch-marked and local coinage of Ayodhya and an inscribed terracotta sealing paleaographically assignable to late 3rd century B.C. to early 2nd century B.C. and reported from the upper middle phase were the other important finds. A terracotta disc has been also reported from this period. Sometime towards the first quarter of the period, township was fortified with mud rampart which was topped by walls of burnt bricks at regular intervals. Houses during the period were built of burnt bricks laid in mud mortar and often provided with ring wells. The occupation came to an end towards the beginning of the 1st century A. D. After some gap the deposits of Period III was noticed in a limited area. These remains could not be dated earlier than 4th-5th century A. D. But in the intervening period, Sravasti must have had some habitation, about which enough has been reported from the earlier digging already referred.

Findings :

Period I on the basis of several red ware shapes and other cultural equipments like terracotta discs, iron, nail-parers and glass bangle, etc. show a remarkable similarity with the PGW phase (Period II) of Hastinapura and hence corresponds with the Early Phase of Iron Age. The Early Phase of Iron Age at the site is, therefore, characterized by the occurrence of NBP, black-and-red, black slipped and a few sherds of PGW. Period II dated from 300 B.C. to the beginning of 1st century A. D., called post-NBP, in our estimate is the Late Phase of NBP and consequently the Late Phase of Iron Age. Its cultural components like potteries (both red ware and thick grey ware), moulded figurines, beads, extensive use of iron and less of copper, system of coinage, fortification and burnt brick structure with ring wells etc., are largely coeval with the Late Phase of NBP at Hastinapura III. Period III is partly post-NBP and partly later in date.

22. Manwan :

An excavation[1] of the site was conducted by K.N. Ojha of the U. P. Government in the years 1968-69 and 1969-70. The lowest level was associated with NBP, the succeeding ones, by Sunga, Kushan and Gupta Periods. A brick lined well and a burnt brick structure of brick size 40×26×6 cm were the only finds of the NBP Period.

Findings :

The earliest occupation at the site starts with the Late Phase of NBP or the Late Phase of the Iron Age.

23. Ahichchhatra :

During the years 1940-44, the Archaeological Survey of India under the direction of K. N. Dikshit and A. Ghosh excavated this site. Their work[2] revealed the presence of nine strata', beginning from before 300 B.C. to about 1100 A.D. Although in plot AC XV, the PGW was noticed in the lowest levels but its pre-NBP status could not be ascertained by the excavations.[1] The earliest deposit dated prior to 300 B. C. did not yield any structures. Period II (*C.* 300-200 B. C) was represented by. NBP, terracotta human figurines, etched beads and inscribed copper coins. The mud brick structures which were present in Period II also continued in Period III dated from *circa* 200-100 B.C.[2] The first structure of burnt bricks was noticed in Period IV of the first century B.C, when the city was also surrounded by a defensive wall. Panchala coins were numerous in Period IV but also continued in Period V. N. R. Banerjee, in the year 1963-64, after a gap of about twenty years, reexcavated the site. The work was resumed by him in the year 1964-65 and in view of the appearance of Ochre Coloured Ware is this session, the sequence of cultures noticed in the previous excavation had to be changed. The sequence of cultures now are as follows[3].

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[1] *Indian Archaeology, 1968-69, A Review*, (1971), p. 39; 1969-70, (1973), p. 44.

[2] *A. I.*, no. 1, pp. 37-40, and the description on pp. 137-140.

Period I, with an average thickness of 60 cm was represented by Ochre Coloured Ware. Period II, with a 1.22 m clayey deposit with streaks of sand, was characterized mainly by PGW and a dish-on-stand in plain red ware. The other antiquities of the period were animal terracotta figurines and spindle-whorls. Both copper and iron were in use. The presence of mud-floors with post-holes, remains of mud bricks and a broken burnt brick of 22×6 25 cm size, were the evidence of structural activities in this period. This overlapped with the deposit of Period III. The deposit of Period III, 1.22 m in thickness, was marked by burnt clay and brick-bats, rammed into compact mass was, represented by NBP, thick grey ware, carinated *handis* and pear-shaped vases in red ware. The use of burnt bricks along with mud-floors having evidence of multiple ovens, indicated structural remains. The other antiquities included animal and human terracotta figurines, beads of carnelian and terracotta, pestles and querns, iron objects, copper rings, nails and pins. Period IV, with a deposit of 2 m, was post-NBP and contains the RPW sprinklers, familiar Kushan bowl, stamped potteries and coins of Kushan kings.

Findings :

Period IV with an average deposit of 2 m is Kushan. Period III which immediately precedes it, is about 1.2 m in thickness. How much it can be pushed back in point of time from the Kushan levels is a matter of guess. Then Period III is characterized by NBP, coarse grey ware, carinated *handi* and pear-shaped vases in red ware and structures of burnt bricks etc. These are all diagnositc traits of the Late Phase of NBP or the Late Phase of Iron Age. We can compare this period with Sravasti II and Hastinapura III. Period II

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1. *Ibid.*, p. 59.
2. For the exhaustive treatment of pottery, terracottas and beads of Ahichchhatra, see A. Ghosh, and K. C. Panigrahi, 'The Potteries of Ahichchhatra', *A. I.*, no. 1, p. 37 ff, V.S. Agrawal, 'The terracotta of Ahichchhatra', *A. I.*, no. 4, p. 104 ff. and M.G. Dikshit, 'Beads from Ahichchhatra'. *A. I.*, no 8, p. 33ff.
3. *Indian Archaeology*, 1963-64, *A Review*, (1967), p. 43; 1964-65, (1979), pp. 39-42.

with its overlap phase of PGW and NBP will, therefore, represent the Early Phase of NBP or the Early Phase of Iron Age.

24. Kashipur :

The site was excavated[1] by Y.D. Sharma in the year 1965-66 and again by Sharma and T.S Iyengar in the year 1970-71. The only point relevance to our study was that a mass of pottery recovered from the filling contained sherds from PGW to early medieval period. Some pieces of NBP were also collected during exploration in 1960-61.

3. SITES OF THE MIDDLE GANGA PLAIN SOUTH (Figure 2)

25. Koldihwa :

The site is located on the left bank of Belan in Meja sub-division of Allahabad District. It was excavated in 1973-74 and again in 1975-76 by G.R. Sharma, D. Mandal and J.N. Pal. The excavation[2] revealed a sequence of cultures from Neolithic to the Iron Age. The Neolithic culture is represented by neolithic celts, ring-stones, microliths and net or cord-impressed plain red and crude black-and-red wares. The occupation of the chalcolithic culture is marked by the occurrence of wheel thrown pottery which comprises red (both plain and slipped), black slipped and black-and-red wares. The other antiquities recovered from this phase are bone arrow-heads, copper, microliths (represented by cores, short blades and crested-ridged blades), footed querns and terracotta gamesmen. The structural remains consisted of houses made of wattle and daub along with the remains of two mud-walls. The Iron Age deposit is marked by the presence of iron implements such as axe, arrow heads, crucibles and iron slags. Other associated finds comprised circular pits of varying diameters dug for the disposal of waste material, bone points, querns, mullers, beads of terracotta and semi-precious stones, microliths and charred wheat, rice and *moong*.

Findings :

The site according to our delimitation is the esternmost Iron Age site of the Upper Ganga Plain. Though strickly lies in the Vindhyan range, it is important as it revealed a continuity in the occupation from Neolithic to the Early Phase of Iron Age. The chalcolithic element continues to axist significantly even in the Early Phase of Iron Age deposit. An altogether new trait which was absent in the chalcolithic pottery of Kakoria group is the emergence of paintings on red, black-and-red and black slipped wares. This provides a significant link with the chalcolithic culture of Chirand, Chechar, Sohagaura, Kausambi and the last lingering phase of the chalcolithic and the Early Phase of Iron Age of Prahladpur and Rajghat (Sub-period I A). Iron occurs in the form of axe, arrow-heads, crucibles and iron slags. But in the same deposit we also find the pottery of the preceding chalcolithic phase along with microliths. The Late Phase of the Iron Age is conspicuous by its absence.

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[1] *Indian Archaeology*, 1960-61, *A Review*, (1961), p. 67; 1965-65, (1973), pp. 53-54; 1970-71, (1974), pp. 41-45.

[2] *Indian Archaeology*, 1973-73, *A Review*, (1979), pp. 26 to 27 ; 1975-76, (1979), pp. 45-46; B. B. Misra, 'Chalcolithic Cultures of the Vindhyas and the Central Ganga Valley', a paper read at University Grants Commission Seminar on Indian Prehistory held at the University of Allahabad from 29th Nov. to 3rd December, 1980.

26. Kakoria :

The site lies on the right bank of the Chandraprabha in Chakia sub-division of District Varanasi. It was excavated by G. R. Sharma, V. S. Dubey and V. D. Mishra in 1962-63 and 1963-64. The excavations revealed that it is a Chalcolithic-Megalithic site.[1] The whole habitational deposit of 1.57 m was divisible into three phases IA, IB and IC. The finds included a number of microliths consisting of tools, flakes and cores fashioned mostly on chalcedony and agate. Flakes showing crested-ridge technique were in majority. The lithic assemblage is similar with Central India and northern Deccan and belongs to the category of short blade industry. The pottery is without paintings but decoration in the form of incised and applique pattern was available. The types were confined to bowls, dishes, beakers, goblets, lids, footed and perforated vessels and high necked jars. The pottery consists of red, black-and-red, black slipped and plain grey wares (all without any paintings). Of structural remains mention may be made of two houses made of mud and consisting of rooms, courtyard and floors. Iron was absent both from the habitation area as well as from megaliths.

Findings :

Though the pottery of Kakoria is essentially plain (without paintings) but most of the pottery types and also those with incised and applique designs compare well with the Koldihwa chalcolithic group of pottery. The black-and-red, black slipped and microliths of Prahladpur which occur in the lowest level (Sub-period IA) along with iron also offers some parallels.[2] This shows that later phase of the chalcolithic culture of Kakoria of the Vindhyan region and the Early Phase of Iron Age at Prahladpur and other sites were obviously in some kind of contact, although the occurrence of paintings on black-and-red and black slipped wares at Prahladpur is not altogether absent. The occurrence of plain grey ware (1.21%) similar in fabric, texture and shape with the black slipped ware in the chalcolithic level of Kakoria is not without significant.

27. Prahladpur :

This is the type site of this region. It was excavated by the author in March-April, 1963. A cross-section through the highest portion of the mound revealed the total deposit of 6.20 m out of which 2.29 m represents the talus. The remaining well stratified occupational deposit of 3.91 m, representing one period occupation, was divided into Early, Middle and Late Phases.[1] Since the Early, Middle and Late Phases of deposit constitute different stages of one continuous habitation, they connot be differentiated into different periods but can be conveniently called respectively as Sub-period IA, Sub-period IB and Sub-period IC, Sub-period IA was marked by the presence of black slipped ware, black-and-red ware, plain grey ware of the same fabric as that of the Painted Grey Ware but without any paintings, coarse red ware and slipped red ware. Among the percentage figures of these wares, the most abundant in number and shape was the black slipped ware.[2] The other in the diminishing order were the coarse red ware, black-and-red ware, red slipped ware and plain grey ware.[3] In one case on the inner base of fragment of the black slipped ware, a group of wavy lines of uneqnal thickness were picked out in ash-grey by applying or stopping the remaining body with dark black slip. One sherd of the black-and-red ware was also found painted in white with well marked groups of oblique strokes and dots on the inner side of the rim and the sides.[4] Among finds noteworthy were : terracotta discs decorated with incised nail pattern and loops designs around the circumference[5]; pottery disc (with single perforation); both finished and unfinished bone points, (both double ended and one ended points);[6] terracotta cones (both decorated[7] and undecorated) beads of terracotta (*ghata* shaped), banded agate and carnelian; iron slags and a fragment of an arrow head of iron and lastly a rolled fluted core of chalcedony. On archaeological grounds the beginning of this Sub-period IA has been assigned to 673 B.C. On the basis of TF 136, which reads[8] 765 B.C., the beginning of this phase is indicated to C. 8th century B.C. Sub-period IB was marked by the introduction of NBP in large quantity. This ware was an improved variety of the preceding black slipped ware. It appears that by this time potters were able to produce a ware (NBP) which was much more lighter, hard, stain proof, hygenic, highly lustrous and good looking as compared with the black slipped ware. The mode of producing vessels (NBP) in many other colours ranging from brown, silvery, golden, chocolate, pinkish and even red in addition to the black (which was the only colour known in Sub-period IA) also came into practice. Not only this, the potter's technique reached a step ahead in this sub-period, when on the original grey surface of the ware, we start getting two types of slips (slip painting) usually contrasting in colour. The potter's were throughly acquainted with the type of treatment in which there was a complete harmony in between the original clay body, slip, rate of temperature of the firing and the atmospheric condition in the kiln. Slip defects[1] like crazing, crawling, spitting and trickling's were comparatively reduced in this phase This phase has been, therefore, called as the 'Golden Age' for the slip decorative technique in the ceramic tradition of ancient India. Besides this, it was also marked by the presence of large number of terracotta animal figurines in grey in which the application of NBP black slip was visible. A characteristic find of this phase was a fragment of a barrel shaped terracotta pestle whose one surface was made rough by inserting small irregular pieces of stone. The black slipped (plain), black-and-red (plain), red slipped and other red ware associates of the preceding Sub-period IA continued but their frequency was on decline. The frequency of other cultural equipments of the preceding phase like iron objects, bone points, terracotta cones, beads of semi-precious stones and terracotta and terracotta discs were much more and many new shapes and varieties were noticed in them e. g. in this phase the terracotta discs were also decorated centrally (In Sub-period IA, we get decoration only along the circumference). From the late level of this phase, a copper punch-marked coin was reported. This coin contain two perforations which shows that it was probably used as a pendant. Sub-period IC represents the Late Phase of NBP. It is characterized by the greater use of the coarse NBP and coarse grey ware. Highly lustrous and two-coloured specimens of NBP continue but their frequency was less. The sherds of the black slipped ware were negligible and black-and-red ware was totally absent. This phase is marked by the emergence of largely utilitarian shapes like carinated *handis,* pear-shaped vases (Ahichchhatra 10A) not only in red ware but also in coarse NBP and coarse grey ware. Knobbed vessels and sherds decorated with raised concentric bands in coarse grey ware and coarse NBP and ring wells are the other diagnostic trait of this phase. The frequency of the other cultural equipments of the preceding phase more or less continued but their details could not be worked out as the site was disturbed. On archaeological ground, the end of this phase has been dated to about the beginning of the Christian era. After this the site was deserted for unknown reason.

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[1] For details see, *Indian Archaeology, A Review*, (1965), pp. 39-41; 1963-64, (1967), pp. 57-58; G.R. Sharma, *History to Pre-history*, (Allahabad, December, 1980), pp. 78-79.

[2] *Indian Archaeology*, 1971-72, *A Review*, (1975), p. 44.

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[1] A. K. Narain and T. N. Roy, *The Excavations at Prahladpur*, 1963, (Varanasi, 1968), p. 14.

[2] The site yielded variety of shapes in black slipped ware, so far not reported from any site. See *Ibid.*, pp. 24-29.

[3] The yield of this ware was extremely rare. See *Ibid.*, p. 20.

[4] *Ibid.*, p. 33, Fig. 13, Type IG.

[5] Terracotta discs decorated in the central part are not reported from this phase. Discs with decoration in central as well as usual decoration around the circumference are, however, reported from Sub-period IB.

[6] For details of varieties see *Ibid.*, pp. 38-43.

[7] These are also decorated with incised nail-pattern design around the circumference as in the case of terracotta discs.

[8] *Ibid.*, p. 64.

Findings :

It is one period Iron Age site which was in continuous occupation from *circa* eight-seventh[2] century B. C. to the beginning of the Christian era. Iron[3] has been reported in

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1. *Ibid*, p. 66. For details of these defects see page 37, Plate X, Nos. 1, 2, 3 and 4.
2. Radiocarbon date of a charcoal (TF. 196) sample collected from Dump A ascribable to Sub-period IA dated by TIFR after conversion comes to 765 B. C. Although the sample had a large accompanying error but it is more or less consistent with the proposed archaeological estimate of 763 B. C. (*Ibid.*, p. 66).
3. P. C. Pant has unnecessarily criticized Y. D. Sharma when he made a reference that black-and-red ware phase of Prahladpur is associated with iron (See *Indian Prehistory*, (1964), p. 208). Although there is a definite pre-NBP phase at Prahladpur and Rajghat but at both these sites this is associated with iron. Not

all the three sub-periods. The main criteria for dividing the Early and Middle phases *i. e.* Sub-periods IA and IB was the introduction of the highly lustrous sherds of NBP in Sub-period IB. This criteria may be correct in case of the division of sub-periods. But it has been a part of our system also to demarcate the periods on this basis which may not be wholly correct now. For the concept of standard NBP has now been revised. One of the fabrics in the whole orbit of NBP (Fabric B) belongs to that class which cannot be easily distinguished from the black slipped ware of the pre-NBP phase. Hence it is very difficult to pin-point that stratum from which NBP actually starts. NBP has out grown its definition and is now a big institution under which several types find their affiliation[1]. Thapar has emphasized the advent of iron[2] as an important criteria for the change in period. So inspite of the continuance of certain cultural elements like (black-and-red, black slipped wares) and a fluted core of chalcedony (the possible lingering traits of the chalcolithic culture) in Sub-period IA, the emergence of iron in this deposit indicate that it represents the Early Phase of Iron Age. Except the emergence of NBP (which is not a safe criteria for the demarcation of the two Sub-periods IA and IB as stated above) all other important cultural elements of Sub-period IA continued in Sub-period IB. Hence these two sub-periods are part and parcel of the same Early Phase of Iron Age and consequently that of the Early Phase of NBP. But there is a indication that there lies below this a horizon of the chalcolithic culture. But to confirm this more work is needed. Till then, this Sub-period IA probably represent that stage when with the emergence of iron the lithic industry of the chalcolithic culture was towards the fag end of its career.[3] Sub-period IA may, therefore, indicate the possible lingering remnants of the chalcolithic culture and the beginning of the Iron Age deposit at the site. Here we have an antecedant phase of the Early Phase of Iron Age which is almost co-existing with the Early

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only this even some scholars like B. K. Thapar (See *Indian Prehistory*, (1964), p. 211, H. D. Sankalia (See *Archaeological Congress and Seminar Papers*, (1972), p. 159 and 165) and D. Mandal (See *Radiocarbon Dates and Indian Archaeology*, (1973), p. 112), have gone to the extent of including Prahladpur among the sites of eastern chalcolithic culture. It is clearly mention in our excavation report that plenty of iron slags have been found from Dump A, the earliest filling ascribable to Sub-period IA. Also a fragment of a small arrow head (?) of iron has been reported from the late levels of Sub-period IA (See *The Excavations at Prahladpur*, (1968), p. 9 and 63). However, there are definite indication that there lies a horizon of a distinct chalcolithic culture without iron which can only be ascertained by further work. Till then, we cannot include the site in the list of chalcolithic culture.

[1] T. N. Roy, 'A suggested classification of the Northern Black Polished Ware', Puratattva, no. 10, 1978-79. (New Delhi, 1981), pp. 106-109.

[2] B. K. Thapar in *Radiocarbon and Indian Archaeology*, (Bombay, 1973), p. 516.

[3] T. N. Roy, 'An Indication of the Chalcolithic Culture at some sites of Eastern U. P.', a paper read at the UGC Seminar on Indian Prehistory held at the University of Allahabad from 29th November to 3rd December, 1980.

Phase of NBP. Hence the term used by us as pre-NBP for this Sub-period IA now seems to be outmoded. Instead, we would prefer the term Early Phase of the Iron Age or Early Phase of NBP for these two Sub-periods IA and IB. Sub-period IC will then represent the Late Phase of NBP. Thus Prahladpur is the type site where two clear cut horizon of the culture associated with NBP is stratigraphically visible. The Early Phase of NBP or the Early Phase of the Iron Age (Sub-periods IA and IB) is accompanied by some of the traits of the lingering remnants of the chalcolithic culture while the Late Phase of NBP or the Late Phase of Iron Age show some new traits to the exclusion of earlier ones. Although PGW is absent from this Early Phase of Iron but most of the cultural traits are found in common with those of the PGW phase of the western region. Thus these two phases are part and parcel of an Iron Age culture of which Prahladpur is a type site.

28. Takiaper

The site was subjected to a very small scale excavation[1] by the author in 1971-72. The excavation revealed that it was two periods site representing the Early Phase of NBP (Period I) and post-NBP (Period II). A small scale congflagration between two periods denote a cultural break. The Late Phase of NBP is denoted by this break in occupation.

29. Sarai-Mohana :

The site is located on the left bank of the river Barna on the north-eastern out skirts of the city of Varanasi. It was explored by the author in the year 1960-61, when the excavation at Rajghat were in progress. But a small-scale excavation of the site was taken up by A.K. Narain[2] in the session 1967-68.

Findings :

The excavation[3] revealed two cultural periods, with a break in between, indicating the desertion and subsequent reoccupation of the site. Period I, was divisible into three Sub-periods IA, IB and IC (pre-NBP, Early NBP and Late NBP Phases respectively). The cultural equipment including the ceramic industry of all the three sub-periods was similar to that from Prahladpur and Rajghat. Period II roughly assignable to the late medieval times was marked by the presence of red wares in which the shapes like knife-edged bowls and the carinated cooking vessels were known.

30. Buxar :

Its excavation was taken up by Lala Aditya Narain, under the general direction[4] of B.P. Sinha in 1963-64 and 1965-66. Period I, was marked by the presence of NBP, black ware, red ware, iron implements, bone points, antimony rods, punch-marked coins, terracotta female and animal figurines and beads of semi-precious stones. Of the female and animal terracotta figurines some of them were of archaic style. Period II, was characterized by the pottery of the early Christian era, represented mostly by sprinklers and terracotta human figurines with Kushan type head-dressess.

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[1] *Indian Archaeology*, 1971-72, *A Review*, (1975), p. 49.

[2] The author was very actively associated with this work.

[3] *Indian Archaeology*, 1967-68, *A Review*, (1968), pp. 48-49.

[4] *Indian Archaeology* 1963-64, *A Review*, (1967), pp. 8-9; 1965-66, (1973), p. 11.

Findings :

The above description of antiquities show that Period I of Buxar, represents the Late Phase of NBP and Period II is post-NBP. But in the excavations of 1963-64 there are definite indication of an horizon earlier than the Late Phase of NBP.

31. Patna (Ancient Pataliputra) :

The archaeological excavations at Pataliputra so far carried out earlier have not corroborated that it was settled prior to Mauryas. So the K. P. Jayaswal Research Institute decided to conduct the excavations in 1955-56.[1] The work was carried out in four isolated areas at Mahabirghat, Shah Kamal road, Begum-ki Haveli and Government Press Play Ground (all in the city area of Patna) by V.K. Misra under the general supervision of A.S. Altekar. But the report of the excavations was published by B.P. Sinha and L.A. Narain in 1970. A sequence of five periods, the earlier four were continuous in occupation from *circa* 600 B.C. to A.D. 600 and the fifth beginning from A.D. 1600, was established. NBP which was the distinctive pottery in Period I (dated from *circa* 600 B.C. to *circa* 150 B.C), degenerated in fabric and diminished in quantity in Period II (dated from *circa* 150 B.C. to A.D. 100), and finally went out of use in Period III (dated from *circa* A.D. 100-300).

Findings :

On the basis of recent publication of excavation report in 1970, there are two phases of NBP at the site. Period I, represents the early or pre-structural phase while Period II is marked by the presence of late NBP complex. In this phase, NBP occurs in small quantity, sometime stamped with symbols like hollow cross and crescented hill, sometimes also rivetted with copper and lastly interlocked with coarse grey ware. Structures also start occurring in this phase. Period III is post-NBP when the NBP went out of use. The pottery and other antiquities of the Kushan Period have been reported from this period. Thus the Early and the Late Phases of NBP are covered by Periods I and II respectively.

32. Kankarbagh :

The site lies within the city of Patna. The place attracted the attention of the archaeologists in 1970-71, when some sherds of NBP, Mauryan terracottas and the remains of a few wooden pillars were unearthed by the Public Health Engineering Department of the Government of Bihar while laying down a sewer line. In order to find out the significance of the exposed wooden pillars, a small-scale-salvage excavation, was taken up by the Archaeological Survey of India and the Government of Bihar, in the same year, under B. K. Thapar and several officers of the Survey.[1] The excavation revealed as many as fourteen posts arranged in four rows and placed 1.50 to 1.75 m apart. These were enclosed by wooden planks fixed with iron nails and thus formed the core of the defence-wall. It formed part of the palisade of the Mauryan city of Pataliputra.

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[1] B.P. Sinha and L.A. Narain, *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 10 ff. For the brief summary of this excavation see Y. D. Sharma, *Archaeological Remains, Monuments and Museums*, Part I, (New Delhi, 1964), pp. 64-55. Earlier in 1951-55, the site of Kumrahar, situated 5.62 km to the east of Patna Railway Station, was excavated by A. S. Altekar and V. K. Misra. But the antiquity of NBP could not be pushed back prior to *circa* 150 B.C.

Findings :

On the basis of the find of NBP and Mauryan terracotta in the associated deposit of of these posts, we can infer, that the site was in occupation during the Late Phase of the NBP.

33. Rajgir :

It was taken up for excavations by A. Ghosh in 1950. The total deposit was divided into four periods.[2] Period I, was dated earlier than fifth century B.C. Period II, was characterized by NBP culture bringing to light for the first time post-cremation burial. The third and fourth periods in which NBP was absent were dated respectively to first century B.C. and first century A.D. Renewed excavations by D.R. Patil from 1953-55, revealed several elliptical halls perhaps forming parts of some monasteries. In the other areas including even Maniyar Math, NBP and other cultural equipments like ring well, masonry well, terracotta figurines, iron and copper objects were reported. Recently in the years 1961-62 and 1962 63, Raghubir Singh conducted some excavations in the defence area of the New Rajgriha. Here three successive periods of occupation were noticed. Period I, represented by a deposit of the average thickness of 1.21m belong to the pre-defence occupation. NBP along with terracotta human figurines, copper objects, fourteen punch-marked coins and iron formed the various materials of this deposit. The discovery of a steatite amulet and an elaborately carved steatite plaque were the unique finds. In Sub-period IIA, a mud-rampart was built and in Sub-period IIB, a brick wall added on it. Ascribable to the earliest phase of the rampart was also a moat, which was not worked out in detail.

Findings :

In the limited excavation of Ghosh, there is a phase of black-and-red ware (Period I) below NBP (Period II) deposit. In NBP Period, exposed by Raghubir Singh there are two

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1. *Indian Archaeology*, 1970-71, *A Review*, (1974), p. 6 and 64.
2. A. Ghosh, Rajgir, 1950, *Ancient India*, no. 7, p. 86 ff; *Indian Archaeology*, 1953-54, *A Review*, (1954), p. 9; 1954-55, (1955), p. 16; 1957-58, (1958), p. 11; 1961-62 (1969), p. 7; 1962-63, (1965), pp. 5-6; 1974-75, (1979) pp. 19-11.

phases, first is pre-structural and the second is structural. These may be coeval with the Early and Late Phases of NBP. Ghosh's Period III and IV in which NBP was absent represent the remains of post-NBP deposit. The pre-NBP phase is probably covered by Period I. But the excavations conducted by Vijaya Kant Misra in 1974-75 do not take the antiquity of the site beyond 3rd century B.C. The cultural equipment of his Periods I and II corresponds with the Late Phase of NBP (*I.A.*, 1974-75, pp. 10-11).

34. Apsad :

The site was excavated[1] by Prakash Charan Prasad in 1973-74 and revealed two cultural periods. Period I, yielded NBP, black ware and black-and-red ware, one iron object, terracotta figurines and one broken ivory bangle. Period II revealed the remains of Vishnu temple belonging to later Gupta Period.

Findings :

Period I is coeval with the Late Phase of NBP.

35. Oriup :

The site lies about 2 km south-west of Antichak in District Bhagalpur. It was excavated by B.P. Sinha and R.C.P. Singh in the year 1966-67. The excavation revealed[2] a sequence of four cultural periods. Period I was marked by the occurrence of black-and-red ware (both plain and painted), black-slipped and red wares. Associated finds included bone points, fishing hooks of bone, copper bangles and microliths. Period II was characterized by the occurrence of iron objects, fine NBP, black slipped, grey, black-and-red and red wares and bone points etc. After this the site was deserted and reoccupied in Period II which was distinguished by the occurrence of typical Pala pottery. Period IV was marked by the presence of medieval pottery.

Findings :

Period I with black-and-red ware (also painted), microliths and copper is comparable with other chalcolithic level of Bihar. On this substratum of the chalcolithic culture, the Early Phase of Iron Age or the Early Phase of NBP starts with the deposit of Period II having fine NBP and iron. The Late Phase of Iron Age or the Late Phase of NBP is probably covered by the gap between Periods II and III.

36. Champa :

B. P. Sinha and R. C. P. Singh excavated the site from 1969-70 to 1971-72 and B. Narayan and A. K. Singh from 1974-75 to 1976-77. The excavation revealed[3] three

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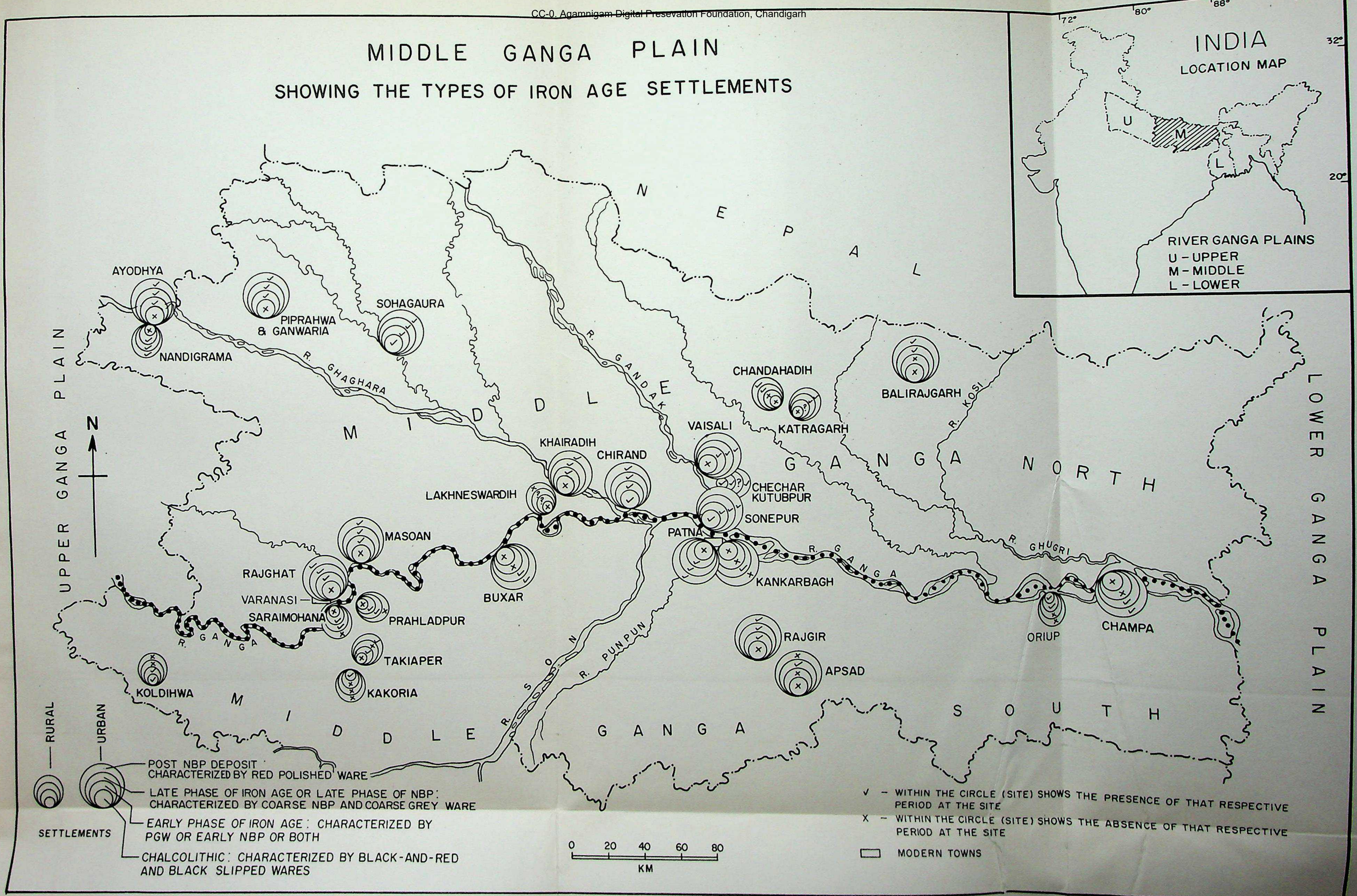
[1] *Indian Archaeology*, 1973-74, *A Review*, (1979), pp. 10-11. Excavations at the site were resumed in 1977-78 and 1978-79 but nothing relevant pertaining to our topic of study has come out.

[2] *Indian Archaeology*, 1966-67, *A Review*, (1975), pp. 6-7.

[3] *Indian Archaeology*, 1969-70, *A Review*, (1973), p. 2; 1970-71, (1974), pp. 4-6; 1971-72, (1975), p. 5; 1974-75, (1979), pp. 8-9; 1975-76, (1979), p. 7; 1976-77, (1980), p. 11.



MIDDLE GANGA PLAIN
SHOWING THE TYPES OF IRON AGE SETTLEMENTS

INDIA
LOCATION MAP
72°
80°
88°
96°
32°
20°
U
M
L
RIVER GANGA PLAINS
U - UPPER
M - MIDDLE
L - LOWER
N E P A L
UPPER GANGA PLAIN
LOWER GANGA PLAIN
M I D D L E
G A N G A N O R T H
M I D D L E G A N G A S O U T H
N
AYODHYA
NANDIGRAMA
PIPRAHWA & GANWARIA
SOHAGAURA
R. GHAGHARA
R. GANDAK
CHANDAHADIH
KATRAGARH
BALIRAJGARH
R. KOSI
VAISALI
CHECHAR KUTUBPUR
SONEPUR
KHAIRADIH
CHIRAND
LAKHNESWARDIH
PATNA
KANKARBAGH
R. GHUGRI
R. GANGA
MASOAN
RAJGHAT
VARANASI
SARAIMOHANA
PRAHLADPUR
BUXAR
R. GANGA
TAKIAPER
KAKORIA
KOLDIHWA
R. SON
R. PUNPUN
RAJGIR
APSAD
ORIUP
CHAMPA
RURAL
URBAN
SETTLEMENTS
POST NBP DEPOSIT CHARACTERIZED BY RED POLISHED WARE
LATE PHASE OF IRON AGE OR LATE PHASE OF NBP: CHARACTERIZED BY COARSE NBP AND COARSE GREY WARE
EARLY PHASE OF IRON AGE: CHARACTERIZED BY PGW OR EARLY NBP OR BOTH
CHALCOLITHIC: CHARACTERIZED BY BLACK-AND-RED AND BLACK SLIPPED WARES
0 20 40 60 80
KM
✓ - WITHIN THE CIRCLE (SITE) SHOWS THE PRESENCE OF THAT RESPECTIVE PERIOD AT THE SITE
X - WITHIN THE CIRCLE (SITE) SHOWS THE ABSENCE OF THAT RESPECTIVE PERIOD AT THE SITE
MODERN TOWNS

FIG. 2

periods of occupation. Period I (*circa* second-first century B.C.), divisible into Phases IA, IB and IC mainly on the basis of the frequency of the finds, was characterized by the use of NBP, black ware, black-and-red ware, plain red and grey wares; iron and copper objects; terracotta animal and human figurines; bone points and beads of glass, stone and terracotta. One female figurine of ivory, a painted sherd of NBP and one sherd of grey ware with an incised human face, are the other interesting finds of these phases. Of the structural remains, a wall of burnt brick of the size 40×25×7 cm, ring wells and a mud rampart having several structural phases may be mentioned. Periods II and III, belonged respectively to the Gupta and Muslim levels.

Findings :

The study of the various cultural equipments of Period I show that it is Late Phase of NBP having definite affiliation with the Early Phase. As the site lies in the main zone of NBP and is also mentioned in Jaina literature as one of the six important cities of the time of Buddha and Mahavira, it is not surprising if further work at the site may bring to light a clear Early Phase of NBP. However, it gives more details of the Late Phase of NBP than any other site.

4. SITES OF THE MIDDLE GANGA PLAIN NORTH (Figure 2)

37. Ayodhya :

The site was excavated by A.K. Narain in 1969-70 in which the author was very actively associated.[1] It revealed three-fold sequence of which the earlier two were continuous, while the last one followed after an abandonment of the site. Period I, was marked by the presence of NBP, coarse grey ware and the associated red ware. Amongst other finds of the period mention may be made of terracotta discs, balls and wheels; bone points and beads of copper, crystal, glass and terracotta. In the upper levels of this deposit, six terracotta human figurines and several animal figurines, all in grey. were found. Some of these figurines are noteworthy for their exquisite modelling and finish. Two local coins of Ayodhya series have been found from the late levels of this deposit. Some iron objects have also been recovered. The period was devoid of any structural activity but this is probably due to the very limited area excavated. Period II, was characterized by the pottery of the early centuries of the Christian era. The well known types being the spouts represented by *Makarmukhas*, ink-pot lids, vertical sharpened rimedged bowls with a thick flat base, all in red ware only. Stamped and decorated pot-sherds have also been found. The other finds include a bone comb, terracotta brick pestles, beads of carnelian and terracotta, and terracotta animal and human figurines. In this period a rectangular burnt brick (size 35×25×5 cm) structure along with a ring well was encountered. The inner dimension of this structure is 78 cm east-west. Period III, which began after a sufficient lapse of time, was marked by the occurrence of the medieval Glazed Ware distinguished by all the varieties. The celadon and procelain wares have been also found. In the red ware the types represented were the hollow-cup-like depression lids, carinated cooking vessels (*handis*), knobbed lids, single-mouthed spouts, horizontally splayed out plates with ringed base and knife-edged bowls. Other antiquities recovered were terracotta dabber, pestle, iron objects, beads and pendants of agate, monochrome and polychrome bangles of glass and terracotta animal figurines especially birds. This period was noted for its intense structural activity. In all, seven burnt brick structures belonging to different structural phase were found. All these structures were made of reused bricks probably robbed from earlier structures.

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[1] *Indian Archaeology*, 1969-70, *A Review*, (1973), pp. 40-41.

Recently the site was reexcavated[1] by B.B. Lal and K.V. Sundara Rajan in the sessions 1975-76 and 1976-77. Period I, dated by them from 7th century B.C. to 3rd century A.D., yielded NBP and a few sherds of grey ware painted with fugitive bands in black pigment along the rim or obliquely on the exterior. In the earlier phase houses were of wattle and daub while in the later part of this period the houses were constructed of baked-bricks. In the later phase fortification wall of bricks and a deep ditch was also noticed. In the Hanuman Garhi area, in the Late Phase of NBP, ring wells of wedge-shaped bricks was found. The occurrence of a grey terracotta figure of a person (Jaina Kevalin ?) with bald head, distended earlobes and in Kayotsarga pose, in levels assignable to 4th century B.C. was probably the earliest Jain figurine of its kind. Period II belongs to 11th century A.D.

Findings :

The sequence of deposit in both the excavations carried out by different institutions and bodies are more or less the same. Here NBP phase is not preceded by any deposit. In the excavations conducted by B.B. Lal and Sundara Rajan, two phases in NBP deposit (Period I) are very clear. In the Early Phase of NBP, the houses were made of wattle and daub but in the Late Phase of NBP, they were made of baked bricks. Ring wells, well of wedge-shaped bricks, fortification and a deep ditch are also assigned to this phase.

38. Nandigrama :

The site was excavated by B.B. Lal under "Ramayana Project'. From the summary of the results, so far, presented in a paper[2] achieved by excavating several 'Ramayana' sites, it appears that it has a regular settlement during the Early Phase of NBP and consequently that of the Early Phase of Iron Age. The habitation also continued at the site during the Late Phase of NBP and post-NBP period. Other details are not known.

39. Rajghat :

This site was excavated by A.K. Narain for several years. In most of these excavations, the author was actively associated. These excavations revealed a continuous sequence of six periods from *circa* 800-700 B.C. to late medieval. Periods I, II and III are relevant to our present discussion. Period I, dated from *circa* 800-700 B.C. to 300-200 B.C., was divisible into three Sub-periods IA. IB and IC. Iron was found in all the three phases. In Period II, dated from *circa* 300-200 B.C., the use of burnt-brick on fairly large scale and regular basis was noticed. Period III, dated from 0 to 300 A.D., was marked by the presence of Red Polished Ware. The detail report on structures, pottery, small finds and terracotta human figurines has been published in four volumes.[1]

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[1] *Indian Archaeology*, 1976-77, *A Review*, (1980), pp. 52-53.

[2] B.B. Lal, 'The two Indian Epics vis-a-vis Archaeology', *Antiquity*, Volume LV, (1981), p. 32.

Findings :

Here we get one blade of chert with painted black-and-red ware in the pre-NBP level *i.e.* in Sub-period IA. In one trench not only iron was absent but some shapes of pottery in red ware were similar with the comparable strata of Chirand so here also there are indication of a horizon of the chalcolithic culture. Similar the division of Sub-periods IA and IB was also made on the basis of NBP. But the combined testimony of other cultural material of these two sub-periods indicate that they are part and parcel of one integral culture which may correspond with the Early Phase of Iron Age or the Early Phase of NBP. The time-span, as proposed on archaeological ground, for these sub-periods is from *circa* 800-700 B.C. to *circa* 400-300 B.C. The Late Phase of NBP is covered by Sub-period IC and Period II dated roughly from *circa* 400-300 B.C. to the beginning of the Christian era. Unlike Prahladpur this site was urbanized in the Late Phase of NBP. Period III is post-NBP with Red Polished Ware.

40. Masaon :

In the session 1964-65, it was excavated by R. B. Narain of Varanaseya Sanskrit University. The excavation continued for several years. The periods in general are similar to the first four cultural periods of Rajghat.

Findings :

On the basis of the comparison of the cultural equipment, Phase A of Period I of Masaon is pre-NBP of Prahladpur and Rajghat. The Early and the Late Phases of NBP are covered by Phase B of Period I and Period II respectively. Period III is post-NBP.

41. Piprahwa and Ganwaria :

Both these sites are in District Basti and are in close proximity to each other. These sites were excavated[2] by K. M. Srivastava from 1970-71 to 1975-77. The Piprahwa yielded impressive structures along with several sealings with the legend Kapilavastu, which helped in locating ancient Kapilavastu, the capital of the Sakyas. The occupational deposit was divided into four periods. Period I, dated from *circa* 8th century B.C. to 6th century **B.C.**, yielded plain grey ware (also painted), black slipped and red ware associated usually with PGW deposit in western parts of Northern India. Period II dated from *circa* 6th century B.C. to 2nd century B.C. to the beginning of the Christian era belong to Sunga times. Period IV has been dated from beginning of the Christian era to the end of the 4th century A.D.

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[1] A. K. Narain and T. N. Roy, *Excavations ai Rajghat*, 1957-58—1960-1965, Part I, (Varanasi, 1976).

A. K. Narain and T. N. Roy, *Excavations at Rajghat*, 1957-58—1960-65, Part II, (Varanasi, 1976).

A. K. Narain and P. Singh, *Excavations at Rajghat*, 1957-58—1960 65, Part III, (Varanasi, 1977).

A. K. Narain and P. K. Agrawal, *Excavations at Rajghat*, 1957-51—1960-65, Part IV, (Varanasi, 1977).

[2] *Indian Archaeology*, 1970 71, *A Review*, (1974), p. 37; 1971-72, (1975), p. 45; 1972-73, (1978), p. 33; 1973-74, (1977), pp. 27-28; 1974-75, (1979), pp. 39-41; 1975-76, (1979), pp. 47-48; 1976-77, (1980), p. 51.

Findings :

Although the site yielded large number of antiquities but their period-wise description is not available. Although typical PGW has not been reported from Period I but close examination of the interim notes show that grey ware dishes painted externally at the shoulder in simple black bands along with grey ware with paintings did occur in this period along with the red ware which are usually associated with the PGW phase of western parts of North India (*I A.*, 1974-75, p. 40, *I.A.*, 1975-76, p. 50, and *I.A.*, 1976-77, p. 51). These red wares are also usually associated with the Early Phase of NBP of the Middle Ganga Plain Hence Period I can be associated with either the PGW phase or the Early Phase of NBP and consequently with the Early Phase of Iron (although neither we get typical PGW nor typical NBP nor iron in it). This Early Phase of Iron Age is also partly covered by the Period III in which we get typical NBP (also painted) along with red ware painted in black horizontal bands. The Late Phase of NBP is covered partly by the later deposit of Period II and the whole deposit of Period III. Period IV is post-NBP.

42. Sohagaura :

The site was excavated[1] by G.C. Pande in 1961-62 and reexcavated by P.N. Chaturvedi[2] in 1974-75. In all, there are five cultural periods. Period I, yielded hand made pottery with mat impressions on the exterior and was ill-baked and coarse. Period II was characterized by the introduction of potter's wheel, black slipped (plain and painted), black-and-red (plain and painted), grey ware and red ware. Applique decoration and graffiti along with designs pick up in reserve technique were also seen on some of the pots. The other finds include : beads of jasper, agate and steatite and a bone stylus or shuttle. A charcoal sample from the lower level of this deposit had been dated to 1330±110 B.C. and another from the middle to 1230±130 B.C. Period III is characterized by the presence of NBP although all other ceramic of Period II continued. The latest level of this phase showed the use of baked bricks. The associated floor levels yielded : burnt grains of rice and wheat, punch-marked and cast coins, bone styli and a number of objects of copper and iron. A charcoal from this phase has been dated to 240±90 B.C. Period IV is marked by the absence of NBP and the presence of Kushan and Ayodhya coins along with ring wells. Period V belongs to the medieval times.

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1. *Indian Archaeology*, 1961-62, *A Review*, (1964), p. 56,
2. *Indian Archaeology*, 1974-75, *A Review*, (1979), pp. 46-47 and pp. 76-77.

Findings :

Here below NBP deposit (Period III) there is a inseparable phase of black-and-red ware and black slipped ware (both painted and unpainted) without iron which may represent the last lingering phase of the chalcolithic deposit. In Period III (NBP deposit) there are clear indication of two phases. In the late phase of this period *i.e.* in the Late Phase of NBP the use of baked bricks, various floor levels, punch-marked and cast coins are clearly seen. PRL-183 derived from Period II and dated to 590 B.C. probably belongs to the Early Phase of NBP. Period IV is post-NBP.

43. Lakhneswar Dih :

It was excavated on a very limited scale by M.M. Nagar in the session 1956-57 and besides the yield of stone, terracotta objects and NBP, nothing more is available in the published accounts[1]. Hence it ir difficult to place this site in any phase of the Iron Age.

44. Khairadih :

The site is situated on the right bank of Ghagra and is about 8 km north-east of Bilthera road in District Ballia of U. P. It is being excavated by the Banaras Hindu University since 1980-81. Result[2] of two season's excavation 1980-81 to 1981-82 indicate the presence of three successive cultural periods at the site. Period I was pre-NBP in character. Notable finds of this period included; black-and-red ware, black slipped ware (both plain and painted also), associated red wares, a bone point, and lumps of clay with reed-impression. Period II, witnessed the emergence of NBP along with other antiquities which are normally being associated with the Early Phase of NBP in this region. On the basis of finds, however, this period could be divided into two phases, Early and Late NBP. Period III, was characterized by the pottery of the early Christian era, represented by red wares and terracotta human figurines with Kushan type head-dresses.

Findings :

Although position of iron is not clear in the so-called pre-NBP phase (Period I) but it corresponds with Sub-period IA of Prahladpur and Rajghat. Probably it represents the last lingering phase of the chalcolithic culture and the beginning of the Iron Age in the region. What is more significant is the find of large number of painted sherds of black slipped ware in Period I. In these sherds the painted designs has been picked out in ash-grey by stopping the rest of the body of the pot with a thin dark slip. Exactly similar painted sherds are also reported from the PGW phase of Hastinapura. Certain important red ware shapes also share common feature with the red ware assemblage of PGW. It will, however, be intersting to work out the details of shapes which continue from chalcolithic while the others which are analogues with the PGW phase. There are two clear phases in the NBPW Period, the Early and Late Phases. The Early Phase of NBP corresponds with the Early Phase of Iron Age and the Late Phase of NBP with the Late Phase of Iron Age of he plains. Period III is post-NBP-

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1. *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 29.
2. Based on information given by Sri Birendra Pratap Singh, the excavator of the site.

45. Chirand :

It was excavated by B.P. Sinha[1] and B.S. Verma in years 1962-63 to 1964-55 and again from 1968-69 to 1970-71 and by B.P. Sinha and L.A. Narain from 1971-72 to 1972-73. In the first three sessions, three successive cultural periods were revealed. The excavation of 1968-69 necessitated the addition of one more Period IV at the top which belonged to Kalachuri dynasty (A.D. 1945) and Pala Period. The diggings of 1969-70 added in the bottom a full fledged neolithic deposit. But the excavations of 1970-71, 1971-72 and 1972-73 not only confirmed the sequence of five periods, but gave full cultural status to the neolithic and chalcolithic deposits.[2] Period I represented the Neolithic culture. Notable finds of this period included : red, grey, black and black-and-red wares (often post firing painting in red ochre on grey ware and rarely on red and black-and-red ware), bone objects and tools ; stone objects including celts ; beads of terracotta, agate, chalcedony; and faience and microliths. Structural remains consisted of floors with depressions and series of ovens with post-holes. Period II was chalcolithic in character. The dwellings of this period were made of the same material but occupied large area. The other cultural material more or less remained the same. Period III, witnessed the emergence of NBP and iron metallurgy. The black-and-red ware and black slipped ware of the preceding period continued. Among other important antiquities mention may be made of a neolithic axe, antimony rods, stone balls, pestles and querns, terracotta toy-cart, terracotta human and animal figurines, iron blades, bone points, a few punch-marked and cast copper coins and remains of baked brick walls in the upper levels. The size of bricks used was 46×25×8 cm. An animal burial in a especially dug circular pit is the latest discovery of this period. A terracotta mask, showing a fierce-looking human face with protruding teeth, bulging nose, rounded eyes and applied moustache and a *kamandalu* in thick grey ware were the other finds. Period IV was marked by the finds of the early centuries of the Christian era. Period V followed after desertion and was distinguished by pre-Moghul Glazed Ware.

Findings :

The chalcolithic remains at Chirand are poorly represented. They are also not well defined from the preceding neolithic phase. Post-firing paintings in red ware has its own individuality. However significant evidence probably indicating that the painted black-and-red ware is later than the unpainted black-and-red ware is provided by Chirand (*I. A.*, 1964-65, p. 7). In Period III of Chirand the distinction between Early and Late Phases of NBP can be made as structures of mud as well as baked brick, punch-marked and cast coins, neolithic axe, antimony rods, bone points and iron objects etc. are all reported together. However, there are definite indications of the two phases of NBP or the Iron Age.

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[1] For more details see *I.A.*, 1972-73, p. 6; 63-64, pp. 6-8; 1964-65, pp. 6-7; 1968-69, pp. 5-6; 1969-70, pp 3-4; 1970-71, pp. 6-7; 1971-72, pp. 6-7; 1972-73, pp. 7-8; *Puratattva*, no. 4, (1970-71), pp. 19-24.

[2] This naturally resulted in redesignation of the deposits. The neolithic was named Period I, Sub-period IA (chalcolithic in content) as Period II, Sub-period IB and Period II (with iron and NBP) as Period III, Period III, as Period IV and lastly Period IV and V as Period V. Since the details of the cultural equipments of various levels are available in old periodization and in order to avoid further confusion we in our description have followed the old periodization. This, however, does not effect the new one.

46. Sonepur :

Its excavation[1] was taken up by Vijayakanta Mishra in 1956-57, by B. S. Varma from 1959 to 1962 and by B. P. Sinha and L. A. Narain in 1970-71. Excavation of 1970-71 revealed two periods of continuous occupation, the first, was chalcolithic in content. Period I, was characterized by black-and-red ware, black slipped ware and red ware. One of the sherd of the black-and-red ware had linear paintings[2] in white. The associated finds included bone points and a copper pin. The inhabitants lived in houses of wattle and daub as attested by chunks of mud plaster with reed impression. Large number of fluted cores, points, lunates and triangles made on agate, chert and chalcedony were the other finds. Period II, witnessed the use of Iron and NBP. The black-and-red ware continued but the presence of painted designs in white pigment on red and black slipped ware was noteworthy. Traces of mud wall were noticed. At one place on a platform were noticed a few complete pots, while at other place, there lay a saddle-quern and four stone-pestles, around probably a hearth. The whole picture was that of a kitchen. Iron implements like lance, spear-head, daggers, etc., and copper ornaments and also a dozen of polished stone axes were the other finds. Among the terracotta object a figurine with a peculiar headdress and a skirt was of unusual interest. In the late phase[3] of this period a floor plastered with lime and two ring wells were also noticed. Brick structures made their appearance, the average size of the brick being 53.3 × 29.2 × 7.5 cm. Punch-marked coins were also in use. Period III, was marked by the absence of NBP and black-and-red ware.

Findings :

Here only one sherd of black-and-red ware of the chalcolithic period is painted in white pigment. The types like dish-on-stand, footed bowl, spout, jug and lota type vessel found in the chalcolithic deposit of Chirand are absent in the comparable levels of Sonepur. However, significant is the continuation of the paintings on the potteries of Period II. Here the painting in white pigment is reported on the red and black slipped ware of Period II *i. e.* the Early Phase of Iron Age. The NBP deposit *i. e.* Period II can be divided into two phases only on the basis of baked brick structures which made their appearance in the late phase. Thus the Early and Late Phases of NBP and consequently that of Iron Age are covered by Period II of the site. Period III is post-NBP.

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1. For more details see, *I. A.*, 1956 57, p. 19; 59-60, p. 14; 60-61, pp. 4-5; 61-62, pp. 4-5; 70 71, pp. 3-5.
2. *Indian Archaeology*, 1970-71, *A Review*, (1974), p. 6.
3. *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 20.

47. Vaisali :

T. Bloch of the Archaeological Survey of India, excavated the site for the first time in 1903-04 and proved that Basarh was an ancient township of the Gupta empire. Its antiquity was further pushed back up to the Mauryan age by the excavations of D. B. Spoonar in 1913-14. These two excavations placed the identity of the site with ancient Vaisali beyond doubt and gave impetus for further work.[1] Krishna Deva of the Archaeological Survey of India, therefore, excavated the site on a larger scale in 1950. Further excavations from 1957-58 to 1961-62 were carried out by K. P. Jayaswal Research Institute, first two season's under Sita Ram Roy. The sites excavated were ancient tank, a *stupa*. Raja-visala-ka-Garh, Bhimen-ka-palla, Chakramdas, Beniya, Lalpura and Virpur. The results[2] of all these excavations has appeared in two excavation reports and several *Indian Archeology Reviews*. The overall habitation is divided into four periods of occupation dated from *circa* 500 B.C. to A.D. 500. Of this, Period I is divisible into two Sub-periods IA and IB. Sub-period IA is marked by the presence of black-and-red ware, NBP, bone points and iron objects. Several sherds of the grey ware, two of them painted in black, one of them painted with a leaf design and one with wash like painting in black deserve mention. This phase was devoid of any structural remains. In Sub-period IB, dated from 300 to 150 B. C., NBP and grey ware continued but the kiln-burnt bricks, beads of semi-precious stones and terracotta figurines of *nagas* made their appearance. There was considerable increase in the structural activity in Period II dated from 150 B.C. to A.D. 100. NBP, punch-marked and cast copper coins and votive plaques were other objects from these levels. Periods III and IV dated from A.D. 200 to 300 and A.D. 300 to 500 respectively were characterized by red ware, well built brick structures and terracotta sealings and figurines of the Gupta Period.

Findings :

The total deposit of Vaisali Sub-periods IA, IB and Period II, all marked by the presence of NBP can be divided into two phases of NBP. Sub-period IA with black-and-red ware, grey wares sherds[3] painted in black, a few pieces of NBP, iron and without any

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1. *A.S.I.*, *A.R.*, 1903-04, p. 88 ff. and *A.S.I.*, *A.R.*, 1913-14, p. 98 ff.
2. *Vaisali Excavations*, 1950, (Vaisali, 1961), p. 1 ff; *Vaisali Excavations*, 1958-62, (Patna, 1969); *Indian Archaeology*, 1957-58, *A Review*, (1958), pp. 10-11; 1958-59, (1959), p. 12; 1959-60, (1960), pp. 14-16; 1960-61, (1961), p. 6; 1961-62, (1964), pp. 5-7.
3. Vibha Tripathi (Vibha, 1976, p. 21) says that these sherds are doubtful pieces of PGW. This may not be the case. Now PGW is not a single homogenous type of ware produced out of a single technique. Now we have number of wares of different shades of grey or even red colour with paintings in black which come within the fold of PGW. Obviously, we cannot remove these wares also from the new concept of the PGW,

structural remains is the Early Phase of NBP. Late Phase of NBP, represented by the deposits of Sub-period IB and Period II (covering a span from *circa* 300 B. C. to 100 A.D.), is marked by the introduction of burnt brick structures, coarse grey ware and NBP. Period III is post-NBP.

48. Chechar-Kutubpur :

R. S. Bisht conducted a small-scale excavation[1] at this site in 1977-78 and brought to view a three-fold cultural sequence. On the basis of the divergences that exist within the ceramic assemblage, Period I, has been divided into three phases A, B and C. Period IA is dominated by red and grey wares of deep grey and blackish tone. Decoration exist in the form of applique designs on the shoulder, consisting of twisted rope, pinched and cut patterns. Bone and antler tools and a few clay bins circular in shape are the other finds of this phase. This phase has been compared with the neolithic of Chirand. In Period IB, the pottery of the preceding phase continue but some pot forms get modified. Necks of jar become fairly elongated and spouted vessels appear. The sophisticated bone and antler tools are conspicuous by their absence though ordinary tools continue. In Period IC, grey and black-and-red wares increase in number while red ware decreases in frequency. A thin walled black ware having shiny black slip makes its appearance. Also white paintings in the form of straight or oblique strokes or dots appear in this phase. Ochre paintings not only continue but become more emphatic in this level. Small *chalice*-cups on hollow or solid and short stems are common. Micro-beads of unidentifiable material also occur. The people of Period I lived in huts made of wattle-and-daub plastered with husk mixed earth. Successive mud floors are also reported. Common pottery shapes of this period as a whole are small vase, small to medium sized jar, dish-on-stand, bowl with featureless rim and ovoid body and sometime having a ring base and shallow and deep dish. Ochre painting, generally restricted to thin bands on the rim has been found throughout this period, contrary to Chirand evidence. Polished stone tools are also represented.

Period II is marked by the appearance of NBP and its associated wares. The black-and-red ware of the preceding phase continues with certain changes. A huge pit, measuring 2 m deep and 5 m wide yielded baked brick and iron pieces. Period III is represented by large brick structure belonging to the Kushan Period.

Findings :

The site has a Neolithic-chalcolithic base on which NBP and iron comes in Period II. The black-and-red ware of the preceding phase however continues in Period II which marks the beginning of the Early Phase of Iron Age at the site. Although ochre-painting continue throughout Period I (which is contrary with Chirand) but what is significant is that white paintings in the form of straight or oblique or dots appear later in Period IC. This fact is corroborated by a similar evidence from Chirand, Pandu Rajar Dhibi and Sonepur. Another significant evidence provided from this site is the emergence of black slipped ware (described by the excavators as thin walled black ware having shiny black slip) also in

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[1] *Indian Archaeology*, 1977-78, *A Review*, (1980), pp. 17-18.

Period IC. These two combined evidence shows that painted black-and-red ware and black slipped ware are later than the unpainted black-and-red ware. We may look for such evidence on other sites also. It is difficult to demarcate the two phases of NBP in Period II in view of the paucity of the evidence. However except for baked bricks which are reported from a pit ascribable to this period, the other meagre evidence indicate that it should be placed in the Early Phase of NBP or the Early Phase of Iron Age. Period III is post-NBP.

49. Chandahadih :

This site was excavated[1] by Sita Ram Roy in 1977-78. The occupational deposit was divided into two periods. Noteworthy antiquities of Period I, datable to 2nd century B.C. to 1st century A.D. include : NBP, grey ware, *ghata*-shaped beads, bone pins and nails of iron. Period II is marked by the continuation of the grey ware and other antiquities o the earlier period.

Findings :

Both these periods on the basis of the associated finds correspond with the Late Phase of NBP. Although natural soil was not struck, on the basis of the present evidence, the site was not inhabitated during the Early Phase of NBP or the Early Phase of Iron Age.

50. Katragarh

Its excavation[2] was taken up by Sita Ram Roy from 1975-76 to 1978-79. Period I, called Mauryan Period yielded NBP, grey ware sherds showing linear painting in black as compared with Vaisali and Kausambi, antimony rods and bone points. Natural soil was, however, not reached. Period II, called Sunga Period, revealed three phases in construction of the fortification wall, Sunga terracotta figurines, intensive building activities in baked bricks, grey and black-and-red wares. Period III dated to 1st or early 2nd century A.D. yielded only red wares, a gold coin of Huvishk and a few sealings. Period IV is assignable to the Pala Period.

Findings :

Maurya and Sunga Periods (Periods I and II) on the basis of the associated finds corresponds with the Late Phase of NBP. Although the natural soil was not struck, the find of grey ware sherds painted in black (similar to PGW reported at Vaisali and Kausambi), do indicate the presence of the deposit belonging to the Early Phase of Iron Age at the site. If the grey ware sherds painted in black are similar to the PGW reported at Kausambi and Vaisali, then, the site is significant in marking out the easternmost limit of the PGW.

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1. *Indian Archaeology*, 1977-78, *A Review*, (1980), p. 15.
2. *Indian Archaeology*, 1975-76, *A Review*, (1979), p. 8; 1976-77, (1980), p. 12; 1977-78 (1980), pp. 15-16; 1978-79, (1980), p. 67.

51. Balirajgarh :

The site was excavated[1] by Raghubir Singh and B. Mukherjee in the year 1962-63 and again by Sita Ram Roy in the sessions 1972-73 and 1974-75. These excavations brought to light the remains of a fortification which in its earlier stage was built of big-sized baked bricks. The core of the rampart yielded a few pieces of NBP. The cutting in the habitational area revealed two cultural periods. But the natural soil could not be struck due to high water table. Period I, dated from 2nd century B.C. to 2nd century A.D., yielded a few sherds of NBP, grey ware, terracotta figurines and plaques of the Sunga Period, antimony rods, iron and beads of semi-precious stones. In Period II, dated from 2nd century A.D. to 6th century A.D., no NBP was found.

Findings :

Due to high water-table in the area, the natural soil was not reached and hence pre-defence deposit could not be exposed. Nevertheless, Period I of the site do contained material ascribable to the Late Phase of NBP and consequently that of the Late Phase of Iron Age.

5. SITES OF THE LOWER GANGA PLAIN SOUTH (Figure 3)

52. Mahisdal :

The site is situated on the north bank of the Kopai in District Birbhum. It was excavated by R. P. Das in 1963-64. Excavation revealed two cultural periods without any break, the earlier (Period I) chalcolithic and the later characterised by the use of iron (Period II).[2] The chalcolithic culture was marked by the presence of black-and-red ware, plain and painted in white, black slipped ware and red wares. Painted designs included oblique strokes, sigmas and inter connected loops. The lipped bowl or channel spouted bowl, carinated bowl and convex-sided bowl with sagger-base were the common shapes in all the wares. Other finds comprised : microliths, consisting of short blades, lunates and scrapers; bone points; a copper celt; a decorated bone comb; terracotta weights and phallus and beads of semi-precious stones. Structural remains consisted of floors made of beaten earth with a soling of rammed terracotta nodules and plastered reed and clay-daub remains. In the second structural phase of a floor, large quantity of charred rice was found scattered. In Period II the ceramic of Period I continued. New feature was the occurrence of iron objects like arrow-heads, spear-heads, chisels, nails as well as the large quantity of iron ore and slags. Buff and grey wares also appeared in this period. A single sherd of coarse grey ware with bold smudgy strokes was also noticed. Microliths continued to occur but the interesting find was a small clay sealing with two symbols and a broken piece of an elephant in motion.

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[1] *Indian Archaeology*, 1962-63, *A Review*, (1965), pp. 3-4; 1972-73, (1978), p. 7; 1974-75, (1979), p. 10.

[2] *Indian Archaeology*, 1963-64, *A Review*, (1967), pp. 59-60.

Findings :

Here the chalcolithic elements like pottery and microliths continue to exist significantly even after the introduction of iron *i.e.* the continuation is dominant in the Early Phase of Iron Age (Period II). Profusion of rice in the last phase of the chalcolithic (*i.e.* in the second and the last structural phase) culture and the beginning of the Early Phase of Iron Age is rather impressive. A significant feature is the introduction of grey ware and a single sherd of coarse grey ware with bold smudgy strokes in the Early Phase of Iron Age (Period II) at the site.

53. Pandu Rajar Dhibi :

The site lies on the south bank of the river Ajay in District Burdwan. It was excavated[1] in 1961-62, 1962-63, and 1964-65. Five periods were identified in 1961-62 and in the later excavations only four. Period I was characterized by thick hand made grey ware bearing impressions of paddy-husk and wheel turned thin ware of plain and sandy fabric and a kind of pale red ware. After this the site was probably deserted due to flood. Period II gave evidence of a prosperous chalcolithic culture marked by the presence of black-and-red ware (both plain and painted), microliths consisting of flakes and cores, copper objects and bone tools. In Period III, the pottery and microliths of the preceding period continued. However Iron was introduced in this period. Among the noteworthy feature of this period was a row of six elliptical ovens flanked by a thick layer of ash containing a broken sword blade and iron slag, showing probably the evidence of iron smelting at the site. Among other finds mention may be made of large quantity of charred rice; copper rings, bangles and a leaf-shaped spear or arrowhead; bone arrowheads, picks and points, gold, pellets; terracotta figurine with pinched head; terracotta flesh-rubbers and iron objects. Period IV which followed after a gap, belonged to the early historical period. Among the noteworthy finds of this period mention may be made of a few sherds of NBP, iron objects, a saddle quern, a terracotta goldsmith's mould and a small disc-like gold bead and copper objects. The site threw some light on the burial practices of the earlier periods.

Findings :

Here like also Mahisdal, perhaps, two main periods may be identified. The first chalcolithic and the other Early Phase of Iron Age, a sample from the former yielding a carbon-14 date of 1012±120 B.C. The remains of the chalcolithic element, like Mahisdal, continue to exist even in the Early Phase of Iron Age. It is significant to note that painted black-and-red ware is reported from Period II while the unpainted pottery occurs in Period I (*I.A.* 1962-63, p. 43; *I.A.*, 1963 64, p. 62; *I.A.*, 1964-65, p. 45). Similar evidence we also get at Chirand, Sonepur and Chechar-Kutubpur *(Supra)*.

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[1] For details see P. C. Dasgupta, *The Excavations at Pandu Rajar Dhibi*, (Calcutta, 1964) and *Indian Archaeology*, 1961-62, *A Review*, (1964), pp. 59-63; 1962-63, (1965), pp. 43-44; 1963-64, (1967), pp. 61-62; 1964-65, (1969), pp. 46-48.

54. Bharatpur :

The site lies on the left bank of river Damodar and was superficially excavated by S.C. Ray and S.K. Mukerjee in 1971-72. This excavation only yielded the remains of a Buddhist *stupa* and a monastery-complex[1]. S.K. Mukherjee and S.N. Samanta resumed the work in 1973-74 and 1974-75 which revealed four cultural periods[2]. Period I was marked by the presence of black-and-red ware, plain and painted in white, black and white painted red ware; tiny stone celts, microliths, coper objects and bone tools. Reed-impressed burnt clay plasters and two open hearths indicate the remains of structures. Period II, which shows an overlap with the preceding period was marked by the introduction of iron implements. The upper levels of this period yielded a few NBP and black slipped ware. The site was deserted after this and was reoccupied in Gupta Period. After a break it was again occupied during 8th and 9th centuries A.D.

Findings :

Period I with black-and-red ware, the shapes and designs of which are similar to those of Mahisdal and Pandu Rajar Dhibi along with microliths represent the late phase of the chalcolithic culture. Period II, with iron and NBP, overlaps with the preceding phase and represents the Early Phase of Iron Age. There is no evidence of the Late Phase of NBP or Late Phase of Iron Age at the site as it was deserted after Period II.

55. Tulsipur :

A small scale excavation[3] of the site, situated below the confluence of the rivers Kasai and Kumari, was undertaken by Mrs. J. Birmingham of the Sydney University and S. K. Mukherjee in the year 1967-68. The excavation revealed three phases of which the earliest was represented by black-and-red, gritty red and micaceous wares along with some floors and a pit. Iron was found in it. In the next phase, black-polished and grey-polished pottery, a few chalcolithic red ware and some black-and-red ware were found. Iron was also present. The last phase was marked by the presence of bright red ware.

Findings :

Though the iron is reported throughout the earlier two phases but continuous development from chalcolithic to Early Phase of Iron is, however, indicated at the site.

56. Tamluk

The site was taken up for excavation[4] in 1954-55 by M. N. Deshpande and again in 1973-74 by S. K. Mukherjee. It revealed five periods of occupation. Period I was marked by the presence of black-and-red ware, tiny polished stone celts and bone tools. Period II

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1. *Indian Archaeology*, 1971-72, *A Review*, (1975), p. 50.
2. *Indian Archaeology*, 1973-74, *A Review*, (1979), pp. 32-33; 1974-75, (1979), p. 51 and 77.
3. *Indian Archaeology*, 1967-68, *A Review*, (1968), pp.49-50.
4. *Indian Archaeology*, 1954-55, *A Review*, (1955), pp. 19-20; 1973-74, (1979), p. 33.

yielded NBP and its associated pottery and floors of rammed bricks grits. Period III belonged to Sunga times. In Period IV Rouletted Ware and Red Polished Ware were noteworthy. Period V belonged to Medieval times.

Findings :

Although no regular habitational deposit of Period I could be noticed but the presence of black-and-red ware, bone points and tiny neolithic tools indicate the possible lingering remnant of a chalcolithic culture in the area. Periods II in all probability corresponds with the Early Phase NBP, although the evidence of brick grit floor is found in it. Period III with Sunga finds corresponds with the Late Phase of Iron Age at the site. Period IV is post-NBP.

6. SITES OF THE LOWER GANGA PLAIN NORTH (Figure 3)

57. Chandraketugarh :

The site lies 37 km north-east of Calcutta. Four sites Chandraketugarh, Khana-Mihirer-Dhipi, Itkhola and Noongola and parts of the village called Berachampa, were under continuous excavation and exploration from 1956-57 to 1967-68 by the University of Calcutta under K. G. Goswami and others. In the first season[1], the excavation at Chandraketugarh area revealed remains of a fortified township with five cultural periods, ranging possibly from the pre-Mauryan to Gupta times. Period I did not yield anything except red wares. Period II was marked by the advent of NBP, black slipped ware and stamped grey ware dishes, antimony rods, punch-marked coins, a dish of the Rouletted Ware and terracotta human figurines. It was called Maurya-Sunga Period. Period III was post-Sunga. Periods IV and V were Kushan and Gupta respectively. In the second season, besides confirming the sequence in the Chandraketugarh area another mound known as Khana Mihirer Dhipi was taken up for excavation.[2] On the basis of the finds, the occupation in this part was divided into six periods starting from the pre-Gupta times to post-Pala age. In the third year, excavation at both the sites continued resulting in the confirmation of a temple of the Gupta Period in the Khana-Mihirer-Dhipi area besides dividing the occupation at the site into three broad periods.[3] The earliest date antedating the temple complex was of Kushan Period. Periods II and III, were probably Gupta and post-Gupta respectively. In the fourth session, besides continuing the work at Khana-Mihirer-Dhipi, the excavation of the third mound called Itkhola lying to the west of the Berachampa-Haroa Road was also taken up.[4] At Khana-Mihirer-Dhipi, the temple complex was exposed to a greater extent but this time the occupation of the area was divided into seven periods

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[1] *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 29 ff.

[2] *Indian Archaeology*, 1957-58, *A Review*, (1958), p. 51 ff.

[3] *Indian Archaeology*, 1958-59, *A Review*, (1959), pp. 55-56.

[4] *Indian Archaeology*, 1959-60, *A Review*, (1960), p. 50 ff.

LOWER GANGA PLAIN

SHOWING THE TYPES OF IRON AGE SETTLEMENTS

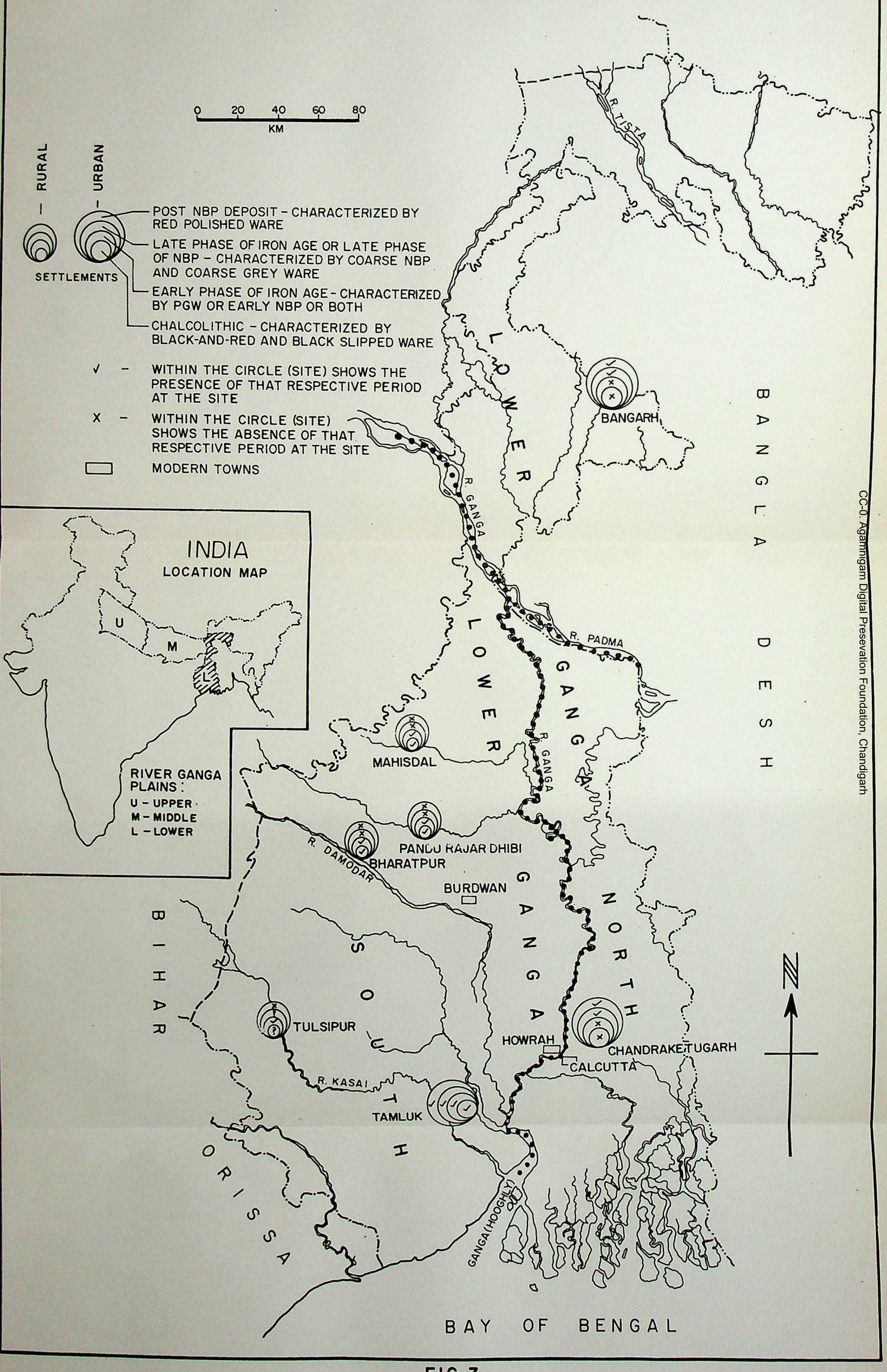
0 20 40 60 80
KM
– RURAL
– URBAN
SETTLEMENTS
POST NBP DEPOSIT – CHARACTERIZED BY RED POLISHED WARE
LATE PHASE OF IRON AGE OR LATE PHASE OF NBP – CHARACTERIZED BY COARSE NBP AND COARSE GREY WARE
EARLY PHASE OF IRON AGE – CHARACTERIZED BY PGW OR EARLY NBP OR BOTH
CHALCOLITHIC – CHARACTERIZED BY BLACK-AND-RED AND BLACK SLIPPED WARE
✓ – WITHIN THE CIRCLE (SITE) SHOWS THE PRESENCE OF THAT RESPECTIVE PERIOD AT THE SITE
x – WITHIN THE CIRCLE (SITE) SHOWS THE ABSENCE OF THAT RESPECTIVE PERIOD AT THE SITE
▭ MODERN TOWNS
INDIA
LOCATION MAP
U
M
L
RIVER GANGA PLAINS :
U - UPPER
M - MIDDLE
L - LOWER
R. TISTA
LOWER
BANGARH
BANGLA DESH
R. GANGA
R. PADMA
LOWER
GANGA
MAHISDAL
R. GANGA
PANDU RAJAR DHIBI
BHARATPUR
R. DAMODAR
BURDWAN
GANGA
NORTH
BIHAR
SOUTH
TULSIPUR
R. KASAI
TAMLUK
HOWRAH
CALCUTTA
CHANDRAKETUGARH
ORISSA
GANGA (HOOGHLY)
BAY OF BENGAL

FIG. 3

insteads of the three of the last year's. Period I was assignable to Maurya age. Period II was of NBP and Period III was that of Sungas. Periods IV, V, VI and VII belong to Sunga-Kushan, Gupta, late-Gupta and post-Gupta respectively. The excavations at Itkhola brought to light six periods of occupation starting from Period I which yielded only red and buff ware. Period II belonging to Mauryan age yielded NBP. In this period the remarkable discovery was the pottery drain built of pipes. In the next session (1960-61), the excavation was resumed only on the Khana-Mihirer-Dhipi mound. An extension of the excavation to the north of the temple-area yielded evidence of six periods of occupation. There was no trace of any brick structure in Periods I to III and Period I was marked by the find of the fragments of the Rouletted Ware. Thus cultural sequence at Khana-Mihirer-Dhipi mound was changed for the third time. In the session 1961-62, excavations at the same area resulted in revealing of eight[1] occupational periods extending from pre-NBP to 10th century A.D. Period I again did not yield anything. The natural soil was also not struck due to sub soil water. Period II dated from sixth century B.C. to third century B.C., yielded NBP, coarse grey ware with paintings etc. NBP was found along with Rouletted Ware in Period V ascribable to *circa* first century B.C. to first century A.D. In the next session[2], the site was taken up for excavation by C.R. Roychaudhary who brought out several structural remains including the remains of the votive stupas besides revealing six periods of occupation. In the session 1963-64, the work was undertaken[3] both at Khana-Mihirer-Dhipi and Itkhola. At Khana-Mihirer-Dhipi the excavation confirmed the six period of sequence reported earlier. But the excavations at Itkhola revealed four successive periods commencing with the NBP to *circa* sixth century A.D. corresponding to those at Khana-Mihirer Dhipi. The level earlier than NBP, could not be reached due to rains and the two post-Gupta periods noted at Khana-Mihirer-Dhipi could not be identified at Itkhola mound. Next year (1964-65), D.P. Ghosh and C.R. Roychaudhary continued work at both the sites. In Itkhola area a rampart and a moat were the additional defence structures noted in detail this year besides establishing the sequence of the temple complex at Khana-Mihirer-Dhipi. In the year 1965-66[4], besides resuming work at the previous sites another mound called Noongola was also taken up for excavation. Operations at Khana-Mihirer-Dhipi exposed the entire eastern portion of the outer wall of the main temple with its three structural phases, one of which was Gupta and the other two post-Gupta. Digging at Itkhola this year revealed that the earliest habitation started with the NBP, copper punch-marked coins, terracotta and stone beads and bones of fish etc., Period II, was distinguished by typical Sunga terracotta figurines and other things. Period III, representing Kushan Period was marked by the presence of the Rouletted Ware. Periods IV and V were Gupta and post-Gupta respectively. Excavation at Noongola confirmed the sequence of Itakhola.

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1. *Indian Archaeology*, 1961-62, *A Review*, (1964), pp. 62-63.
2. *Indian Archaeology*, 1962-63, *A Review*, (1965), pp. 46-47.
3. *Indian Archaeology*, 1963-64, *A Review*, (1967), p. 53, ff.
4. *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 59 ff.

Digging of 1966-67 at Khana-Mihirer-Dhipi yielded antiquities belonging from Maurya to Kushan times. In the exploratory work of 1967-68 a temple of *circa* seventh-eight century A.D. was exposed.

Findings :

There is no substantial evidence to push the antiquity of the site beyond the Mauryan Period. But Mauryan Period on ward NBP along with its assemblage start appearing at the site and it continues up to the first century A.D. along with Rouletted Ware. The earliest habitation at the site, therefore, starts with the Late Phase of NBP or the Late Phase of Iron Age.

56. Bangarh :

The ancient ruins are found on the eastern bank of the Punarbhava about 29 km to the south of Dinapur. The sacredness of this river has been highly spoken of in the Puranas and it is a feeder of the Padma, a major distributory of the Ganga. Although the site was excavated[1] by K.G. Goswami for four successive season's from 1937 to 1941 and again in 1951, its importance as NBP bearing site was realized when Krishna Deva and Wheeler mentioned it in their 'NBP list' of 1944 and Y.D. Sharma published a note[2] in 1953. Subsequently it was also referred by Lal in his 'NBP list' of 1954-55.

The excavations, however, revealed five periods of occupation called 'strata' by the excavator. Period I, corresponding with the NBP culture was the earliest. In it a ring well was also exposed. Period II, was characterized by prosperous buildings, drains, cess-pits, rampart and terracotta figurines of the Sunga Period. Period III, covered the Kushan and Gupta times. The abundance of glazed pottery in Period V leaves no doubt that it belongs to the early medieval age.

Findings :

The Late Phase of the Iron Age or the Late Phase of NBP is covered by Periods I and II. Period III is post-NBP.

7. CONCLUSION :

The above survey of the excavated Iron Age sites of the Ganga Plain revealed that although not a single site has so far being excavated horizontally but their potential significance in the output of the material remains cannot be under estimated. This is by far the largest group of sites so far vertically excavated in India. A critical study of this Iron Age deposit and the deposits immediately preceding and succeeding it and its periodization made on the basis of pottery (particularly the provenance and non-provenance of PGW and NBP), emergence of iron and the structures of baked bricks led us to come to the following conclusion.

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[1] K.G. Goswami, *Excavations at Bangarh*, (Calcutta, 1948). For earlier work at the site see, *An. Rep. Arch. Surv. Ind.*, 1921-22, p. 83 ff.

[2] *Ancient India*, no. 9, p. 155; see also *Arch. Remains, Monuments and Museums*, p. 78 and 79.

In between Saka-Kushan level and the chalcolithic culture lies an Iron Age deposit which could be conveniently divided into two phases, the Early Phase of Iron Age and the Late Phase of Iron Age.

Early Phase of Iron Age :

On some sites the Early Phase of Iron Age is represented by the so called PGW culture (in which PGW is one of the dominant attribute), on others, by the overlap phase of PGW and NBP and on some by the Early Phase of the so called NBP culture (in which NBP is one of the dominant attribute). On a few sites the deposit of this phase is devoid of PGW and NBP but with it is recorded iron indisputably for the first time and also present are such pottery-type and other antiquities, as were hitherto known only from the above levels assignable to this phase. The structures of baked bricks and system of coinage are totally absent but iron slags or iron objects are introduced from the very beginning. Historically it is pre-Mauryan. It is definitely pre-urban in nature. The type sites are Hastinapura II (for PGW phase), Sravasti I (for overlap phase of PGW and NBP), Prahladpur IA and IB (for the Early Phase of NBP), Koldihwa and Mahisdal (for that phase of Early Iron Age which is devoid of PGW and NBP).

Late Phase of Iron Age :

This succeeds the Early Phase of Iron Age. On some sites this phase has been described as structural phase of NBP while on others as defence phase (Sravasti and Balirajgarh). In this deposit, the black-and-red, black slipped and PGW of the preceding Early Phase of Iron Age almost disappears but NBP continues but its frequency is less. The characteristic potteries of this phase are coarse grey ware, coarse NBP and red wares of different fabric and shapes. The common shapes are pear-shaped vases (Ahichchhatra 10 A), rimless carinated *handis,* nail headed basins and pans or *karahis* with loop or lug handles. On majority of sites there are definite indications of a better cultural prosperity. This is reflected with the introduction of structures of baked bricks, ring wells, drains and soakpits and fortifications against enemies. Historically this is Maurya-Sunga Period and archaeologically it can be also called as the Late Phase of NBP. The type sites are Hastinapura III, Allahapur IB, Sravasti II, Ahichchhatra III, Prahladpur IC and Champa I.

Post-NBP Phase :

Stratigraphically this phase succeeds the Late Phase of Iron Age or the Late Phase of NBP. This has been designated by various excavators as Sunga-Kushan Period or Kushan

Period or Kushan-Gupta Period or Indo-Roman Period or Late Historical Period. It is well documented by several numismatics, epigraphic, typical terracotta figurine and ceramic evidence. For the sake of convenience we have called it 'post-NBP deposit', because it succeeds the Late Phase of NBP. The NBP is absent in this deposit and the cultural equipment totally differs from the preceding Late Phase of NBP. It is characterized by the presence of an altogether different pottery of the early Christian era including the well known Red Polished Ware. Roughly this phase falls within the chronological span of the beginning of the Christian era to third century A.D. Historically this is coeval with Saka-Kushan Period.

3

Chronology

1. CHRONOLOGY OF THE PAINTED GREY WARE (PGW)

A. Earlier Views :

In 1946 Krishna Deva and R.E.M. Wheeler were the first to surmise, on the basis of the material from pre-defence deposits of Ahichchhatra, that the painted wares (*i.e.* PGW) and the black polished sherds (*i.e.* NBP) were conterminous to each other.[1] On the other hand evidence from another plot (Plot ACXV) also led them to suppose that the priority of the former to the latter was probable. The PGW was, however, not commissioned for extending the date at the site beyond B C. 300, but remained enigmatic.[2] Such a possibility of an overlap between these two wares was also pointed out by them in the hastily operated lower levels of Rajghat[3] (Varanasi). In 1949, B. B. Lal in course of his exploratory dig at Hastinapura observed that the lower levels of the site which contained PGW were devoid of NBP,[4] which was located a few feet higher up. The same sequence was noted by him at Tilpat.[5]

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1. Krishna Deva, and R.E.M. Wheeler in Appendix B, The Pottery of Ahichchhatra, *Ancient India*, no. 1, (1946), pp. 58-59.
2. *Ancient India*, no. 1, (1946), p. 38.
3. *Ibid*, p. 59. Krishna Deva who salvaged Rajghat in 1940 does not mention this overlapping anywhere in his report. See Krishna Deva in *Annual Bibliography of Indian History and Indology,* Volume 111, pp. xli-li. However in our extensive excavations at Rajghat we have found a few plain grey ware which are similar in fabric and finish with the PGW except that our specimens are not painted. See A.K. Narain and T.N. Roy, *Excavations at Rajghat*, 1957-58—1960-65, Part II, *The Pottery,* (Varanasi, 1977), p. 25.
4. *The Statesman*, New Delhi Edition, July 5, 6 and 9, (1950).
5. *Ibid.*

Combining this evidence from Hastinapura and Tilpat trail excavations and refuting the earlier one from Ahichchhatra and Rajghat, he published a paper[1] in the year 1950, indicating the possibility of the PGW being earlier in origin than the NBP. Although in the later phase of the occupation at these sites a overlap between these two wares was noticed by him. The final spade at Hastinapura from 1950-52 decided that the PGW was definitely earlier in date than the NBP. Not only this, cultural haitus was also noticed between these wares. On the basis of the then available archaeological date (at that time the radiocarbon method of dating was not available) supported by the literary evidence, B. B. Lal placed the PGW culture ranging from *circa* 1100 to *circa* 800 B.C. at the site with a probable extension on the earlier side.[2] This proposed chronology of PGW in 1954-55, though accepted uncritically by many, had its critics in A. Ghosh in 1952 and again in 1976, D.H. Gordon in 1954-55, 1957 and 1958, Wheeler in 1959, G.R. Sharma in 1960, the present author in 1964-65, Sankalia in 1968, D.P. Agrawal in 1968 and 1971, K.N. Dikshit in 1973, Agrawal and Kusumgar in 1974, Vibha Triphathi in 1976 and Agrawal, R.V. Krishnamurthy, Kusumgar and R.K. Pant in 1978.

Gordon said[3], "Great possibly too great hopes are being built on PGW, discovered mainly at a large number of sites on the eastern borders of Punjab and in the upper Ganga-Yamuna Doab........." It seems unlikely that PGW can carry us back earlier than 650 B C. and this I regard as optimistic." After two years again in 1957 he reacted[4], "Here, because the dating of the PGW goes back to 1100 B.C. fits a theory of Vedic origins, an unnecessarily long gap of 200 years is postulated when 100 years at the outset would suffice, NBP being clearly an extension of PGW with a new fashion of surface treatment. Lal's dates for the beginning of Periods II and III are 1100 and 600 B.C., there is a good case, if not better, for substituting 700 and 350 B.C." A year after in 1958, he mainatined[5] almost the same view. Thus Gordon dated PGW at Hastinapura between 700 to 350 B.C. and the beginning of NBP in 4th century B.C. Wheeler on the other hand said[6], "If the initial date of NBP Ware in the Ganges region be placed somewhere in the 5th century B.C., then the bulk of PGW is certainly earlier than that date.........the beginning of the PGW might be ascribed to the 8th century B.C." Thus Wheeler had bracketed PGW from 800 to 500 B.C. and the beginning of NBP in the Ganga Valley to 5th century B.C. A year later G. R. Sharma said[7], "The

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1. B.B. Lal, 'The PGW of the Upper Gangetic basin', *Journal Royal Asiatic Society Bengal (Letters)*, XVI, (1950), p. 89 ff.
2. *Ancient India*, nos. 10 and 11, (Delhi, 1954-55), p. 23.
3. D.H. Gordon, 'The Pottery Industries of the Indo-Iranian.Border', *Ancient India*, nos. 10 and 11, (1954-55), p. 175.
4. D.H. Gordon, *Antiquity*, vol. 31, (1957), p. 108.
5. *The Prehistoric Background of Indian Culture*, (Bombay, 1958), pp. 165-170.
6. *Early India and Pakisian*, (Bombay, 1959), p. 28.
7. G.R. Sharma, *The Excavations at Kausambi*, 1957-59, (Allahabad, 1960), p. 59.

view of the gap between the end of the PGW and the beginning of the NBP is no longer tenable." He, however, emphasized that during its later phase, the PGW continued to survive along with the NBP. Our arguments of 1964-65 have been already elaborated elsewhere[1] and need not be discussed here. It is sufficient to point out at the moment that the minor changes illustrated in the cultural equipment of PGW and NBP levels of Hastinapura could not force one to imagine a gap of 200 years. On the other hand we tried to make out a case for bringing PGW levels more close chronologically to NBP and vice-versa. While summarising the whole paper in the end the present author observed that "the customary division of the periods in the prevalent cultural schemes of the PGW and NBP should now be changed. We cannot regard the PGW and NBP as isolated phases representing different culture, at least, in the Ganga Valley. Both the wares are co-eval and hence denote one integral culture[2]."

Sankalia in archaeological seminar held at the University of Aligarh in 1968 observed, 'Taking all these developments into consideration it was thought in the symposium held on the PGW at Aligarh that PGW culture most probably belongs to 6th-5th century B.C. and if it represent the Aryans these would not be the earliest Aryans but one of their latest groups'. D. P. Agrawal in the above archaeological seminar of 1968 and again in 1971 examined all the factors on which Lal's dating of PGW was based and came to the conclusion[3] that, 'In the archaeological evidence there is nothing to suggest an antiquity greater than *circa* 9th-8th century B.C. for this ware. In this light, Wheeler's estimate of *circa* 800-500 B.C. seems to be quite pausible'. On the basis of available radiocarbon dates he also indicated a time bracket of *circa* 800 to 400 B.C. for this ware[4]. In 1973, K.N. Dikshit on the basis of his excavations at Allahapur where he found a terracotta sealing inscribed in late Mauryan characters along with PGW, said that the antiquity of the PGW continued even up to the Mauryan times and its antiquity could not be pushed prior to 800 B.C.[5]. D.P. Agrawal and Kusumgar[6] on the basis of radiocarbon dates, in 1974, repeated the same time-bracket of *circa* 800 B.C. for this culture and Vibha Tripathi in 1976 lent a support[7] to this of *circa* 800-400 B.C. for this culture and Vibha Tripathi in 1976 lent a support[7] to this

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1. T.N. Roy, 'Stratigraphical position of the PGW in the Gangetic Valley', *Bharati*, Bulletin of the College of Indology, B.H.U. no. 8, Part II, (1964-65), pp. 64-76.
2. T.N. Roy, *Op. cit.*, p. 75.
3. D.P. Agrawal, *The Copper Bronze Age in India*, (New Delhi, 1971), pp. 84-88.
4. *Ibid.*, pp. 100-102.
5. K.N. Dikshit, 'The Allahapur Evidence and the PGW Chronology' in *Radiocarbon and Indian Archaeology*, edited by D.P. Agrawal and A. Ghosh, (Bombay, 1973), pp. 148-53.
6. D.P. Agrawal and Sheela Kusumgar, *Prehistoric Chronology and Radiocarbon in India*, (New Delhi, 1974).
7. Vibha Tripathi, *The PGW; An Iron Age Culture of Northern India*, (Delhi, 1976), p. 68.

shorter chronology already proposed by Agrawal in 1971. Ghosh[1] in 1952 and again in 1976 enumerated several problems posed by PGW and one of them was, 'what is the earliest date of ware and how much reliance can be placed on the high dating of the eleventh century B.C., arrived at by some archaeologists on circumstantial evidences and later on supported by carbon-14 measurements of a single specimenfrom Atranjikhera, though the same method has yielded much younger dates for the specimens from other sites.[2] In 1978 Agrawal and others pushed the upperlimit of PGW to 300 B.C. which lent an indirect support to the point raised by Dikshit in 1973 that the PGW continued without any change up to the Mauryan times.

Not withstanding the views expressed by the above scholars, Lal has not only reaffirmed his span of PGW from *circa* 1100 to 800 B.C. in the PGW seminar at Aligarh in 1968 but has slightly pushed[3] its antiquity to 1115 B.C. in 1973. In support of his chronology he put forward one radiocarbon date of 1025±110 B.C. from PGW levels of Atranjikhera but at the same time also said in the seminar that all is not too well with radiocarbon dating. Deshpande referring to Ambakheri evidence also gives some facts which has a indirect bearing towards earlier dating of PGW. In his opinion the regions covered by OCP and PGW are more or less the same, there is some similarity between the red ware associates of PGW and OCP and finally there is partial contemporaneity[4] between the two. R. C. Gaur has pleaded for the early dating on the basis of two grounds[5]. The first is the one radiocarbon date of PGW at Atranjikhera which reads 1025±110 B.C. Secondly, he thinks that the PGW deposit lying over black-and-red ware are much earlier in context than those deposit which do not show such a sequence. He further says that at Atranjikhera and Noh the PGW culture started somewhere in the 11th century B.C. if not earlier and at Hastinapura it is comparatively later. D. Mandal though feels that the shorter chronology proposed from *circa* 800 to 400 B C. does not rest on any firm footing but seems to have adopted a somewhat middle course by bracketing it from *circa* 1000 to 400 B.C.[6] Recently after twenty five years *i.e.* after the publication of Hastinapura report in 1554-55. B.B. Lal after examining the evidence from all[7] the PGW site for which ^{14}C dates are available, has said that the

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1. A. Ghosh, 'The Rajputana Desert—Its Archaeological Aspect' – Proceeding of the Symposium on the Rajputana Desert, *Bulletin of the National Institute of Sciences of India*, no. 1, (Calcutta, 1952), pp. 37-42.
2. A. Ghosh in *The PGW : An Iron Age Culture of Northern India*, (Delhi, 1976), p. V.
3. B.B. Lal, 'Archaeology and the Two Epics', *ABORI*, Volume LIV, (1973), Plates I-IV, p. 4.
4. M.N. Deshpande in *Indian Prehistory*, (Poona, 1965), p. 129.
5. R.C. Gaur, 'Date of the PGW Culture, *Proceedings of the Seminar on Archaeology*, Aligarh, 1968 (In Press).
6. D. Mandal, *Radiocarbon Dates and Indian Archaeology*, (Allahabad, 1972), pp. 1‘6-167.
7. B.B. Lal, 'Did the PGW Continue up to the Mauryan Times', *Puratattva*, no. 9, 1977-78, (New Delhi, 1980), pp. 64-80.

beginning of all the above PGW sites cannot be later than *circa* 1000 B C. They may well go back even earlier. All these opinions on the subject show that the dating of the PGW is still open to different explanations. Hence there is a need to examine a fresh the dating aspect of the PGW in the light of the comparative stratigraphy and the radiocarbon dates from all the sites which have yielded this ware. For thus alone a comparison between the archaeological dating and the corresponding radiocarbon determinations can be made.

B. Dating of PGW on Comparative Stratigraphy :

We shall begin our survey with sites in the Ganga Plains and will then come to sites found outside the plains.

Hastinapura :

The dating of NBP to *circa* 6th century B.C., postulating a gap of 200 years between PGW and NBP deposits *i. e.* between Periods II and III, equating PGW with Aryans, copper age association and the absence of Iron-technology in PGW levels, corelation of the flood which washed away a considerable portion of the PGW settlement within the regime of Nichakshu, fifth ruler after the *Mahabharata* battle and lastly the occurrence of horse and rice in the PGW levels, enable B. B. Lal to determine the chronological span of the PGW at Hastinapura from *circa* 1100 to *circa* 800 B. C. Since the publication of Hastinapura report in 1954-55, several important factors have come to light. The two distinct stratigraphical context of an Iron Age (as enumerated in Chapter II), a phase of black-and red ware immediately preceding the PGW phase on sites like Atranjikhera, Noh, Jodhpura and Jakhera, a phase of black-and-red ware immediately preceding the Early Phase of NBP on sites like Chirand, Sonepur, Prahladpur and Rajghat, overlapping of PGW and NBP, the early radiocarbon date of NBP on sites like Sringverapura and Mathura, occurrence of not only slag but large number of finished objects of iron in the PGW level and finally an indication of non-iron phase of PGW at Bhagwanpura, Nagar, Kathpalon and Dadheri etc.

Period III of Hastinapura on the basis of less number of NBP, coarse grey ware, structures of baked bricks, ring wells, drains, coinage, carinated *handi* and pear shaped vases in red ware (Ahichchhatra 10 A) etc., represent the Late Phase of NBP. If we look to the NBP sites all over India, we cannot find a single site where this phase of NBP has been dated earlier than 400 B.C. Hence it would be reasonable to ascribe this phase of NBP at Hastinapura to fourth-third centuries B.C. The cultural material associated with the so called PGW deposit of Hastinapura (Period II) show a remarkable similarity with the so called pre-NBP and the Early Phase of NBP of the Middle Ganga Plain, which cannot be dated earlier than *circa* seventh century B.C. Hence it would be unreasonable to ascribe this phase of PGW at Hastinapura to earlier than seventh century B.C. Secondly the PGW and NBP phases *i. e.* Periods II and III of Hastinapura are the rural and urban phases of the same Iron Age. The marked evolution in the material equipment of NBP Period does show that the site was urbanized during this phase, a stage for which was already set in the preceding PGW phase. Thus there is not much reason to postulate a long gap of 200 years in between PGW and NBP phases of the site. Only a small portion of the settlement was abandoned for a short time due to floods in the Ganga, the evidence of which we get only at Hastinapura I and not at other trenches. A pre-PGW, black-and-red ware deposit is also absent at Hastinapura hence the PGW phase at this site is certainly later than those sites which revealed a pre-PGW phase of black-and-red ware.

Allahapur :

Sub-period IA represents the Early Phase of Iron Age in which we get black-and-red, black slipped, PGW, iron and red ware assemblage of Hastinapura II. Thus it is coeval with the PGW phase of Hastinapura. Sub-period IB contains all the basic traits of the Late Phase of NBP (although NBP is absent) and consequently that of the Late Phase of Iron Age and hence cannot be dated earlier than 4th-3rd centuries B.C. The absence of coins, NBP sherds and presence of insignificant remains of baked brick structures show that the site was not urbanized during the Late Phase of Iron Age. Throughout its occupation it remained a village settlement.

Alamgirpur :

Period II of Alamgirpur with black-and-red ware, black slipped ware, PGW, bone points, structures of mud and iron corresponds with Period II of Hastinapura and consequently with the Early Phase of Iron Age. Period III of this site with pear-shaped vases (Ach. 10 A), carinated cooking *handi*, ring wells and burnt brick, corresponds with Period III of Hastinapura and consequently with the Late Phase of Iron Age or Late Phase of NBP. Like Allahapur here also we do not get a single sherd of NBP in the Late Phase of Iron Age.

Kesari :

Its Period II characterized by a few PGW, black-and-red ware and black slipped ware corresponds with the Early Phase of Iron Age and Period III is covered by the Late Phase of Iron Age. Here also like Allahapur and Alamgirpur we do not get a single sherd of NBP in the Late Phase of Iron Age.

Hulas :

Here the Early Phase of Iron Age corresponds with Period II *i. e.* the so called PGW culture. Period III which overlapped with the deposit of Period II in the earlier levels corresponds on the basis af cultural equipments, with the Late Phase of Iron Age or Late Phase of NBP. Here NBP sherds do occur in this phase.

Kalsi :

The site provides good evidence for the dating of the Late Phase of Iron Age. Collection from this site includes the bowls and dishes in thick grey ware along with carinated *handi* in associated red ware. These collections along with the rock-edict of Asoka nearby suggest that the site was inhabited during Mauryan times or during the Late Phase of Iron Age.

Sravasti :

Period I on the basis of PGW, several red ware shapes, terracotta discs, nail parers, glass bangles, iron etc. show a remarkable similarity with the PGW phase (Period II) of Hastinapura and hence corresponds with the Early Phase of Iron Age. Period II, dated from 300 B.C. to the beginning of the 1st century A.D., called post-NBP, in our estimate is the Last Phase of NBP and consequently the Late Phase of Iron Age. Its cultural components like thick grey ware, moulded figurines, system of coinage, fortification, ring wells and burnt brick structures etc. are largely coeval with the Late Phase of NBP at Hastinapura III.

Ahichchhatra :

Period II was characterized mainly by PGW with usual shapes and designs which we get in the comparable levels at Hastinapura. It overlaps with Early NBP and then succeeded in Period II by the Late Phase of NBP which is also coeval with Hastinapura III and Sravasti II. Since the PGW deposit at this site also contained NBP one would then think that this represent the Early Phase of NBP. Thus this overlap of PGW with Early NBP put the PGW phase of the site on the late context.

Mathura :

Here the stratigraphical position of the PGW and NBP is comparatively well defined than at Ahichchhatra. Period I dated from *circa* 6th century B.C. to the closing decades of the 4 th century B.C., was divisible into two Sub-periods IA and IB. IA represent PGW phase which is devoid of NBP while in IB the PGW overlaps with NBP without any major change. Period II corresponds with the Late Phase of NBP.

Here also like Ahichchhatra there is no pre-PGW phase. The PGW phase (Period IA) is superimposed by the Early Phase of NBP (*i.e.* Period IB or overlap phase of PGW and NBP). Further the limited occurrence of black slipped and black-and-red wares along with the evidence of early two structural levels in Period IA and the date of around 500 B.C. for Period IB, it is not possible to push the antiquity of PGW deposit *i.e.* of Period IA at Mathura beyond 600 B.C.

Sonkh :

The Early Phase of Iron Age corresponds with the pre-Mauryan phase of the site in which PGW, black-and-red ware and iron slags are reported. Phase II with NBP, coarse grey ware and a coin represents the Late Phase of Iron Age and consequently the Late Phase of NBP.

Batesvara :

The Early Phase of Iron Age is marked by the presence of iron, PGW, black-and-red, black slipped wares, terracotta discs and bone points etc. In the Late Phase of Iron Age we find NBP, coarse grey ware, baked brick structures, ring well and coins etc.

Atranjikhera :

The Early Phase of Iron Age is covered by PGW deposit (both true and late PGW), overlap phase of PGW and NBP and pre-structural phase of NBP. The Late Phase of Iron Age by the structural phase of NBP or the Late Phase of NBP. This site revealed a pre-PGW black-and-red ware phase without iron hence here the Early Phase of Iron Age or the PGW phase can certainly be dated slightly earlier than other sites.

Jakhera :

The combined evidence from both Periods II and III like the find of iron objects (right from the beginning of Period II *i.e.* from PGW phase), terracotta discs, bone points, antimony rods and the overlap of PGW and NBP show that they correspond with the Early Phase of Iron Age. The occurrence of baked bricks, although for only ritualistic purpose, in this deposit is a new evidence.

The Late Phase of Iron Age is conspicuous by its absence. Like Atranjikhera here also the PGW deposit is preceded by the black-and-red ware phase without iron and hence here also the Early Phase of Iron Age or the PGW phase can certainly be dated slightly earlier than other sites.

Khalaua :

It is a single culture site which corresponds with the Early Phase of Iron Age. This is marked by the presence of PGW, black-and-red, black slipped and a piece of NBP in the upper levels of this deposit. There are no indication of the deposit of the black-and-red ware phase nor of the Late Phase of Iron Age. Hence the site may well go back to the sixth century B.C.

Kampil :

Almost all the red ware shapes associated with the PGW deposit at Kampil occur at Hastinapura II and Sravasti I. Consequently the site represents the Early Phase of Iron Age. The Late Phase of Iron Age is absent.

Kausambi :

Periods II and III, dated from 885 B.C. to 45 B.C., marked by the presence of black-and-red ware, PGW, NBP and red ware associates of the PGW level corresponds with the Early Phase of Iron Age. The Late Phase of Iron Age is perceptible in the NBP deposit of the Pillar area. Here also like Atranjikhera and Jakhera the Early Phase of Iron Age is preceded by the black-and-red ware phase without iron and hence can be dated slightly earlier than other sites.

Sringverapura :

Sub-period III A, the beginning of which has been ascribed to *circa* 700 B.C., with NBP, black slipped and a few PGW corresponds with the Early Phase of Iron Age or Early Phase of NBP (although iron has so far not been reported in this level). Sub-periods III B III C with Ahichchhatra 10A, carinated *handi*, structures of baked bricks, coarse grey ware and system of coinage etc. corresponds with the Late Phase of Iron Age or the Late Phase of NBP. Here like Kausambi, Atranjikhera and Jakhera, the Early Phase of Iron Age is preceded by the black-and-red ware deposit. Hence the beginning of the Early Phase of Iron Age (placed to *circa* 700 B.C.) or the Early Phase of NBP (in which we also get PGW) and consequently the beginning of NBP at the site can be dated slightly earlier than other sites.

Vaisali :

Here two pieces of PGW are reported from the Early Phase of NBP *i.e.* from Sub-period IA which precedes the Late Phase of NBP. Hence it is contemporary with Early NBP.

Katragarh :

A few sherds of grey ware painted in black (similar to PGW reported at Vaisali and Kausambi) along with NBP has been reported from Period I called Mauryan Period.

As the natural soil was not struck the find of PGW sherds in Period I do indicate the presence of the deposit belonging to a still earlier date.

Piprahwa and Ganwaria :

Period I dated from *circa* 8th century B.C. to 6th century B.C. yielded plain grey ware, black slipped ware and red ware associated with PGW deposit in western parts of Northern India. Period II, dated from *circa* 6th century B.C. to 2nd century B.C. marks the advent of NBP.

Sohagaura :

At this site, the PGW is reported from Period II along with black slipped (both plain and painted) and black-and-red (both plain and painted) and associated red wares. Period III was characterized by the appearance of NBP, while the other ceramic of Period II continued.

Prahladpur :

Plain grey ware sherds similar in fabric with the PGW were found along with black-and-red and black slipped ware (both plain and painted) in Sub-period IA dated from 800 to 600 B.C. Plain grey ware were also reported at Rajghat from the corresponding levels.

Outside the Ganga Plains, we shall begin our survey with the only excavated northern most site at Manda in Jammu and Kashmir.

Manda[1] :

It has a three-fold sequence of cultures. Sub-period IA is marked by the arrival of the Harappans. In Sub-period IB the Harappan red ware and the grey ware associated with the PGW are found. Period II is marked by the presence of the pottery belonging to the early historical period of northern India. On the basis of the stratigraphy, the interlocking of the Late Harappan and Painted Grey Ware cultures has been placed by the excavator between *circa* 1600 B.C. to 1000 B.C. Thus the grey ware of the PGW complex of northern India at this site belongs to Late Harappan horizon. However no standard PGW as such has been reported from this site nor from any part of Jammu and Kashmir so far. Since no detail account of the excavation is available it is difficult to assess the nature of the associated antiquities (except pottery) with the PGW culture of this site.

Now we come to the excavated sites of Punjab. Proceeding from top to bottom we have Nagar and Kathalon in District Jullundur, Dadheri and Sanghol in District Ludhiana and Ropar and Sugh in District Ambala.

Nagar :

A three-fold sequence of culture, was identified. Period I is represented by PGW culture, Period II by the typical Kushan pottery and Period III represent the habitation of the early medieval times. In Period I there was a sprinkling of the late Harappan sturdy red ware indicating the interlocking of the two cultures.

Katpalon :

A sequence of three cultures was identified. Of these, Period I, is represented by PGW which was found here also interlocked with the late Harappan culture. After a break, this period was succeeded by Kushan which was followed by the disturbed habitation of the medieval times.

Dadheri :

Here also a three-fold sequence of cultures was established. Sub-period IA, the earliest was late Harappan. In Sub-period IB, PGW, black ware, grey and typical late Harappan pottery was noticed. In this sub-period, three structural phases were recognised. In the first phase the people were living in semi-circular huts and in the second phase the houses were made of mud walls. In the third phase the structures were made of baked bricks. No iron was found. The last occupation at the site belongs to the medieval times.

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1. For the detail of excavations at Manda, Nagar, Katpalon, Dadheri and Bhagwanpura see J.P. Joshi, 'Interlocking of Late Harappa Culture and PGW Culture in the light of recent excavations', *Man and Environment*, volume II, (1978), pp. 98-101.

Here also the phenomenon of overlap of the late Harappan and the PGW could be seen is Sub-period IB. But the occurrence of baked brick structures in the last phase of the PGW deposit is a new evidence. For the burnt brick structures are one of the cultural trait of the Late Phase of NBP and cannot be dated earlier than 400-300 B. C.

Sanghol :

In the excavations of 1968-69 and 1969-70, in one of the trenches, PGW was found overlapping with NBP. But in the excavations of 1977-78, in Period IC, the overlap between the late Harappan and the PGW culture was noticed. A baked brick[1] of size 26×11×10 cm. was found in this overlap phase. Periods II and III represent black slipped ware culture which was followed by Period IV belonging to Kushan Period. PGW, however, continue in Period II. Here also there is an overlap of the late Harappan and PGW culture and also we get a baked brick in this PGW levels.

Ropar :

The excavations at this site revealed hiatus between Harappan and PGW deposits. The PGW here was assigned to *circa* 1000-700 B.C. After a gap of about 100 years, a new settlement of the NBP culture (Period III) sprang up by about 600 B.C. From the interim notes so far published it would be clear that Period III with NBP, coarse grey ware and certain shapes like pear-shaped vases and carinated *handi*, coins, ring wells and structures of baked bricks correspond with the Late Phase of NBP or the Late Phase of Iron Age. Hence it could not be dated earlier than *circa* 400-300 B.C. The PGW (Period I) which essentially precedes this Late Phase of NBP, although after a brief gap, cannot be placed much earlier.

Sugh :

Sub-period IA dated from *circa* 600-500 B.C. was marked by the presence of PGW and NBP. Sub-period IB corresponds with the Late Phase of NBP. Here the PGW has been reported from the Early Phase of NBP. The implication would be that here also we cannot place the PGW earlier than the beginning of NBP at the site.

Ghuram :

Period IA dated from *circa* 6th to 4th centuries B.C. is represented by plain grey ware of medium to fine fabric, types being bowls and dishes. Period IB dated from *circa* 4th century onward is characterized by NBP. Some PGW and late Harappan sherds are however reported from the surface of the mound.

In Haryana we have three excavated sites which have yielded PGW. Bhagwanpura, Raja Karan Ka Qila and Kasital in District Kurushera and Autha in District Gurugaon.

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[1] *Indian Archaeology*, 1977-78, *A Review*, (1980), p. 43.

Bhagwanpura :

The site revealed a two-fold sequence of cultures. Period IA, the earliest was represented by late Harappan ceramic. Sub-period IB was marked by the arrival of the PGW people. Stratigraphically there was no break between the two periods. Instead there was a clear overlap. In Sub-period IB three structural phases were noted. In the first phase the people were living in round or semi-circular huts. In the second stage, the houses were built of mud walls and in the third structural phase the houses were built of baked bricks of different sizes. Iron was not found in any of the two cultures. The phenomenon of fusion of the late Harappan and PGW cultures was placed by the excavator between *circa* 1600 B.C. to 1000 B.C. Surprisingly, here also like Dadheri and Sanghol baked brick structures co-occurs with PGW.

Raja Karan Ka Qila :

In one of the areas the habitation belongs to the late Harappan culture but on the main mound the excavations revealed a deposit which could be divided into three cultural periods. Period I, ranging in date from *circa* 400-100 B.C., was characterized by grey ware of coarse fabric occasionally painted[1] on the rim with simple bands. Period II was dated from *circa* first century B.C. to third century A.D. and Period III belonged to Medieval times. The late Harappan pottery from this site is comparable with Bhagwanpura but there is no overlap of the late Harappan and the subsequent culture. Instead, if the grey ware painted with simple bands on the rim belong to the same family of the standard PGW, this site make out a case where PGW is found in a comparatively late context.

Kasital :

In Period I, PGW is found[2] along with a sherd of black-and-red ware, reminiscent of shapes of Ach. 10A and carinated *handi* in red ware and a circular barn. Period II belongs to the early historical times. Shapes like Ach. 10A, carinated *handi* and barns are associated with the Late Phase of NBP. Hence PGW at this site appears to be in late context.

Autha :

Here the earliest occupation starts with Period I which is represented by PGW Period II characterized by the deposit of the Late Phase of NBP overlapped with PGW phase. Hence PGW is in its late context.

We have two sites in Uttar Pradesh Himalayan region of Garhwal[3], Ranihat near Srinagar and Mordhwaj, 13 km. south-west of Kotdwara.

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[1] *Indian Archaeology*, 1975-76, *A Review*, (1979), p. 18.

[2] *Ibid.*, p. 17.

[3] Information obtained from Dr. K.P. Nautiyal.

Moradhwaj :

In Period I dated from *circa* 5 th century B.C. to 2nd century B.C., sherds of fine thin grey ware are reported along with NBP and structures of baked bricks. The thin grey ware are not painted but they belong to the same fabric as that of PGW. Here it co-occurs with NBP and baked brick structures and hence their context is quite late.

Ranihat :

Period I constituting the earliest, yielded the fine unpainted grey ware along with glossy red ware. This according to the excavator is comparable with PGW of Hastinapura Period II. This period has been dated from *circa* 600-500 B.C. to 400 B.C. Sub-period II A with NBP dated from *circa* 400 to 200 B.C. corresponds with the Late Phase of NBP at Hastinapura Period III. Here the date of PGW has not been pushed beyond 600 B.C. which is more or less correct.

Now we pass on to the sites in Rajasthan.

Noh :

The site yielded a separate phase of unpainted black-and-red ware which lies over OCP and below the PGW deposits. PGW phase is comparable with PGW of Hastinapura and from the beginning this phase overlapped with NBP Period. This pre-PGW black-and-red ware phase put it on a different footing from those sites where the earliest occupation starts with PGW. Hence the PGW phase here can be dated slightly earlier.

Jodhpura :

The site confirmed the sequence of Noh and hence the beginning of the PGW phase here also can be assigned to the same time bracket as at Noh.

Bairat :

Period I was represented by a few pieces of PGW along with iron. This with an overlap was followed by Period II containing NBP. Period III belongs to the early centuries of the Christian era. Here also there is an overlap of PGW and NBP but there is no pre-PGW phase. Hence PGW may belong to slightly later context than that of Noh and Jodhpura.

Sardargarh :

The earliest habitation at the site was that of PGW people. After desertion it was occupied by Rang Mahal Culture. No date could be given to such a sequence.

Now we pass on to the sites of Madhya Pradesh.

Ujjain :

One sherd of PGW was found in the core of the rampart which was built in some twenty-five to thirty years after the first settlement of the site in 750 B.C. This find is not of much dating value except that it shows that the PGW was known before or at the time of the erection of the rampart round about 700 B.C.

Jaderua :

Period I, dated from *circa* sixth-fifth century B.C., was marked by the presence of black-and-red along with grey ware, a few sherds recalling[1] the fabric of the PGW. Period II, dated from *circa* mid fourth century B.C. to second century B.C., after a brief gap of time, yielded NBP along with antiquities similar to those found in the corresponding Late Phase of NBP at Hastinapura, Ahichchhatra and Ropar etc. Here the PGW has not been placed before *circa* 600 B.C.

Kayatha :

Period III dated from 1700-1300 B.C. is represented by Malwa Ware. After desertion for about seven to eight centuries, the site was re-occupied in Period IV (dated from *circa* 600 B.C. to 200 B.C.) by a new set of people using black-and-red ware, plain grey ware (similar in fabric with the PGW) and NBP. Here also the PGW has not been placed before *circa* 600 B.C.

Besnagar :

Period I was redesignated as Microlithic. Period II A dated from *circa* eighteen hundred to eleven hundred B.C. as chalcolithic. Period II B dated from *circa* eleven hundred to nine hundred B.C. as chalcolithic and Painted Grey Ware. Period III A dated from nine hundred to five hundred B.C. as pre-NBP which was characterized by plain black-and-red ware and also PGW. NBP appeared in Period III B dated from *circa* five hundred to two hundred B.C. This means that the PGW at this site overlapped with the later phase of the chalcolithic culture and continued in Period III A dated from *circa* nine hundred to five hundred B.C.[2]

We may now look as to what happened outside India. There are two sites in Nepal viz. Banjarahi and Tilaurakot.

Banjarahi :

Here the PGW was found in Sub-period I A, the earliest period of occupation, along with NBP. Sub-period I B was marked by the presence of NBP in abundance. Hence the context of PGW is late and it is indistinguishable from the Early Phase of NBP.

Tilaura-kot :

Here also the PGW occurs along with NBP in the earliest period of occupation dated to *circa* 600 B.C. Period II, dated between 2nd century B.C. to 3rd century A.D. contained the finds of the Sunga-Kushan levels.

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[1] *Indian Archaeology*, 1971-72, *A Review*, (1975), pp. 29-30.

[2] *Indian Archaeology*, 1976 77, *A Review*, (1980), pp. 33-34.

C. Radiocarbon Dating of PGW:

Now we will present before the readers the evidence from all those sites which have yielded PGW and for which ^{14}C dates are available. In doing so, we shall try to give the corresponding stratigraphical sequence also for then alone the validity of the radiocarbon dates in relation to stratigraphy could be seen. In order to evaluate the relative position of these dates, radiocarbon dates from the preceding and the succeeding culture horizons, wherever available, are also considered. In this context, however, it may also be mentioned at the outset that we have not thought to 'calibrate' these dates because uncertainties still exists in their calibration.

For Pakistan, Sind, erestwhile Bahawalpur State, Jammu and Kashmir, Punjab and Haryana we have no radiocarbon dates. Hence we pass on to sites in Rajasthan. Of these, only two, Noh and Jodhpura, have been dated.

Noh :

Four dates, two as appeared in UCLA Date List published in *Radiocarbon*, Volume 7, 1965 and the other as offered by the TIFR Date List of August 1971, are available in respect of this site. In order to evaluate the relative position, one date from the NBP horizon is also given. The date available from these two sources are tabulated below :

NOH—1

Laboratory Number	Period and its Archaeological Date	Phase or Layer from which the sample was derived and its Archaeological Date	Value in B.C. based on 5730 half life
1	2	3	4
UCLA-703 A	Painted Grey Ware Series	Sample H. Trench A, XXII-XXIV—Charcoal sample collected from a stratified layer at the bottom of a hill associated with PGW under 6 ft. of earth cover.	605±260
UCLA-703 B	Painted Grey Ware Series	Sample E, Trench A, XXII-XXIV—Charcoal sample collected from a stratified layer at the bottom of a hill associated with PGW under 6ft. of earth cover.	820±225

1	2	3	4
TF-993	Painted Grey Ware culture	Charcoal from Trench G, Layer 20, Depth 6.9 in.	725±150
TF-1144	PGW culture	Charcoal sample from "a stratified level"	490±90
TF-994	NBP Ware culture	Charcoal from Trench G, layer 14, Depth 4.7 in.	685±105

The above two date lists does not provide the exact phase from which these samples were derived. In the absence of these details it is difficult to decide the initial and the terminal dates of the PGW. Inconsistency is also found between TF-1144 and TF-994 belonging respectively to PGW and NBP cultures. However if UCLA-703B and TF-1144, stratigraphically, represent respectively the lower and upper limits of the PGW deposit, the span of the PGW at Noh could be between 800 B. C. to 500 B. C. Archaeologically Noh PGW deposit has been put on an earlier footing than Hastinapura because here we have a black-and-red ware phase between the PGW and OCP deposits (*Supra*). The stratigraphical relationship of the PGW and NBP is also fairly defined. There is a PGW phase devoid of NBP which is succeeded by the overlap phase of PGW and Early NBP Phase. Culturally however the late phase of PGW and Early NBP remain indistinguishable from each other (*Supra*). It is in this context that we can explain the discrepancy between TF-1144 and TF-994. However in a recent communication to B. B. Lal, the excavators have said that these two samples belong to disturbed layers and hence should not be relied upon. In a recent article of B. B. Lal in *Puratattva*, Number 9, 1977-78, the corresponding cultural horizon of each sample is given. According to him it is now as follows (quoted from his above article) :

NOH—II

Laboratory Number	Cultural horizon	Value in B. C. based on 5730 half life	Calibrated date in B. C. according to Ralph	Calibrated date in B. C. according to Clark
TF-994	Early NBP	685±105	795±105	810±100
TF-1144	Late PGW	490±90	470±90	470±90
UCLA-703 A	Mid PGW	605±260	745±260	735±200
TF-993	Mid PGW	725±150	805±150	840±150
UCLA-703 B	Mid PGW	820±225	900±225	915±225

Thus according to Lal's assessment, 'Since the middle sub-period would range between 900 B.C. and 745 B.C. according to Ralph's calibration, or between 916 B.C. and 735 B.C. according to Clark's and since the early sub-period may go back by another 150-200 years, the beginning of the PGW occupation at Noh may safely be placed sometime, in the eleventh century B.C.—at any rate before 1000 B.C.'. The end of the PGW has been placed by him about 500 B.C. There is no disagreement regarding the upper limit but as regards the lower one, it appears to be less objective as it is based on the computation method which is not very dependable. Secondly we are not yet sure that UCLA-703 B comes from the bottom most layer and UCLA—703A from the uppermost layer of the Mid phase of the PGW. As such, only the bottom most and the uppermost layers can provide a chronological span for a phase in question. The early sub-period of PGW computated by Lal by another 150—200 years is not very clear at Noh. On the other hand two phases of PGW are very distinct. The earlier one is devoid of NBP. This is succeeded by an overlap phase of PGW and Early NBP. Uncertainties still exists in the calibration of ^{14}C dates. According to D. P. Agrawal, 'The tree-ring samples have not provided so far very unambiguous evidence to calibrate the ^{14}C calender......Any calibration at this stage therefore will create more confusion than clarity'. So inspite of this change in position the earliest uncalibrated date of the PGW at Noh on the [basis of UCLA-730 B would not antedate 800 B.C.

Now we come to the other site in Rajasthan viz. Jodhpura. The stratigraphical details and the corresponding dates are available in PRL ^{14}C Date List 1/1976 and PRL ^{14}C Date List 1/1977. These are arranged in our usual tabular from below :

JODHPURA

1	2	3	4
PRL-272	PGW Deposit	Charcoal, Trench D, Layer 12, Depth 1.97 m.	800±150
PRL-274	PGW deposit	Charcoal, Trench D, Layer 12, Depth 2.9 m.	370±110
PRL-213	PGW deposit	Charcoal, Trench E, Layer 7, Depth 3.5 m.	320±110
PRL-273	PGW deposit	Charcoal, Trench E, Layer 8, Depth 2.5 m.	420±150
PRL-212	Black-and-red ware and PGW deposit	Charcoal, Trench D, Depth 2.6 m.	380±100
PRL-275	Black-and-red ware deposit (?)	Charcoal, Trench D, Layer 13, Depth 2.87 m.	2530±160
PRL-277	OCP deposits (?)	Charcoal, Trench D, Layer 14, Depth 1.94 m.	740±110
PRL-278	OCP deposit	Charcoal, Trench D, Layer sealed by 14, Depth 3 m.	2230±180

Let us proceed from bottom upwards. Samples PRL 278 and PRL-277 come from the same layer and from almost the same depth and yet they are not in agreement to each other. Sample PRL-275 which gives a date of 2530±160 B.C. also cannot be accepted as black-and-red ware deposit at Noh, lies between the OCP and the PGW and hence cannot be so early. There also appears to be something wrong with the cultural association of sample PRI-212 for black-and-red ware of this horizon never seems to have persisted as late as 380 B.C. Samples 273 and 213 are more or less consistent provided we presume that the samples were derived from the latest level of the PGW. Hence they will date the upper limit of the PGW at Jodhpura between *circa* 4th-3rd centuries B.C. Samples PRL-274 and PRL-272, though coming from the same layer of the same trench, yet we notice serious disagreement between the two dates and hence also cannot be accepted. Inspite of all these difficulties the earliest date of PGW at the site on the basis of PRL-272 which reads 800±150 B.C. does not go beyond 800 B.C.

We may now take up the sites of the Ganga Plains.

Hastinapura :

The details of the six radiocarbon samples as available from Tata Institute Radiocarbon Date List II, published in *Radiocarbon,* Volume 6, (1964) are arranged in the usual chart below. Five of them belong to PGW phase while the remaining one from the immediately succeeding NBP phase of the site.

HASTINAPURA

1	2	3	4
TF—83	Period II-PGW deposit dated from 1100 B.C. to 800 B.C. on archaeological grounds	Charcoal sample, Trench HST-I, 1962, Locus XCIV-XCVII, Layer 26, and Pit Y sealed by Layer 25, depth 6.75 m below surface. Visible viotlets were hand-picked—*Sample derived from uppermost layer of Period II, marking the end of PGW—Archaeological date—800 B.C.*	335±115
TF—90	Period II-PGW deposit dated from 1100 B.C. to 800 B.C. on archaeological grounds	Charcoal, Trench HST-I, Locus XCIV-XCVII, Layer 26, Depth 6.6 m below surface—*Sample is from the same layer as TF—83.*	390±115
TF—112	Period II-PGW deposit dated from 1100 B.C. to 800 B.C. on archaeological grounds	Bone sample, Trench HST-1, 1962, Locus XC—XCVII, Layer 26 and Pit Y sealed by layer 25. Depth 6.8 m below-surface—	375±100

1	2	3	4
		Sample derived from the latest layer of Period II and will date the flooding of the site which led to its desertion by the PGW using people.	
TF—85	Period II-PGW deposit dated from 1100 B.C. to 800 B.C. on archaeological grounds.	Charcoal, Trench HST-1, 1962. Locus XC-XCIV, Layer 28 and Pit Z sealed by Layer 27. Depth 7.25 to 7.45 m below surface. Visible rootlets were hand-picked. *Sample belongs to the late levels of Period II.*	550±130
TF—91	Period II-PGW deposit dated from 1100 B.C. to 800 B.C. on archaeological grounds.	Charcoal, Trench HST-I, 1962. Locus XVIV-XCIIV, Layer 27. Depth 6.9 m below surface. Visible rootlets were hand picked. *Sample derived from late levels of Period II.*	570±125

The comparison between the radiocarbon dates and the archaeological estimates reveals that the former are invariably younger than the latter. It would be seen from the chart that barring samples TF-90 and TF-112, the rootlets were picked from the remaining four samples. How far this contamination was responsible for giving younger radiocarbon dates can only be determined by the experts ? Samples TF-112, TF-90 and TF-83 reading respectively 375±100 B. C., 390±115 B. C., and 335±115 B. C., all derived from the uppermost deposit of the PGW are consistent. Hence on the basis of radiocarbon dates the end of the PGW phase at Hastinapura can be placed somewhere around 350 B. C. This is also in agreement with TF-88 reading 340±115 B. C. which belongs to the immediately succeeding phase. Thus on the basis of these radiocarbon dates the end of the PGW phase and the beginning of the NBP at Hastinapura can be placed somewhere around 350 B. C. This evidence does not favour in postulating such a long gap of two centuries between the end of the PGW phase and the beginning of NBP. We have two dates for late phase of PGW, viz. 550 B C. and 570 B.C. which are in agreement to each other. For the middle and early PGW levels we have no dates. Some idea, however, may be formed by applying Lal's own reckoning (three centuries according to him is a probable estimate for accumulation of 7 ft strata at Hastinapura) of 300 years for a deposit of 2.1 meters at the site. If we add these 300 years to 350 years (this being the uppermost limit of PGW) we get a date of 650 B. C. for the beginning of PGW at Hastinapura. Thus on the basis of these dates we can place the PGW phase at Hastinapura from 650-600 B. C. to 350 B. C. as against the archaeological date of 1100 to 800 B.C. The absence of an independent horizon of the black-and-red ware deposit also helps us to place this site later than those which have a pre-PGW phase of black-and-red ware.

Allahapur :

We have two dates from this site, the detail of which could be seen in PRL Radiocarbon Date List, July, 1974. The data are tabulated below as usual.

ALLAHAPUR

1	2	3	4
PRL-83	PGW-NBP Sub-period	Wood, Trench Al, 4. Layer 5. Depth 1. 10 m. Rootlet present—Sub-period IB	275±110
PRL-81	PGW	Charcoal. Trench Al, 1, Layer 11. Depth 2.30 m.	385±95

It would be seen from the chart that rootlets were present in sample PRL-83. How for such contamination is responsible for giving younger dates can only be decided by laboratory experts ? In the absence of stratigraphic details it is difficult to decide the relationship of these two dates. However, they may be considered as consistent as PRL-81 belongs to the lower level than PRL-83. But if these dates, stratigraphically, represent the lower limit of Sub-period IB and upper limit of Sub-period IA respectively, then they are more valuable. Hence on the basis of these dates the end of Sub-period IA and the beginning of Sub-period IB could be placed somewhere between 400 to 300 B. C. For culturally, Sub-period IA is coeval with Hastinapura PGW phase and Sub-period IB with the Late Phase of NBP (*Supra*). For its beginning nothing can be said. Recently Lal has doubted the find of PGW in Sub-period IB at Allahapur along with burnt brick structures, NBP associated red wares and a Mauryan seal. In his opinion nowhere in India PGW is found associated with burnt brick structures etc. However, baked brick structures not only co-occurs with PGW at Allahapur but also at Dadheri, Kasital, Sanghol, Bhagwanpura and Jakhera (*Supra*).

Alamgirpur :

From Tata Institute Radiocarbon Date List II, published in *Radiocarbon*, Volume 6, (1964), there is only one date for the PGW deposit at this site which reads A. D. 860±100. According to D. P. Agrawal in this case even the possibility of a wrong identification of the period cannot be ruled out. This is erratic and hence can be outright rejected.

Ahichchhatra :

From Tata Institute Radiocarbon Date List, appearing in Radiocarbon, Volume 8, (1966), we have only one date for the PGW deposit. But in order to give an idea to the reader about the validity or non-validity of this date we have also given below in the chart one date from the immediately succeeding overlap phase of the PGW and NBP.

AHICHCHHATRA

1	2	3	4
TF-311	NBP Ware deposits-Overlap Phase of PGW and NBP	Charcoal from highmound. Locus IX'—X'. Pit No. 5 sealed by Layer 14, Depth 3.8 m. *These deposits also yielded PGW*	475±105
TF-317	Late PGW deposits ?	Charcoal from highmound. Locus X-XI, Layer 15, Depth 3.4 m.—*Sample belongs to disturbed strata.*	270±105

While comparing the radiocarbon date of sample TF-317 with TF-311 we notice that the former is younger by about 200 years than the latter although it is from the earlier strata. Furthermore it is from the disturbed strata and its association with the late PGW deposit is doubtful. Hence this may be ignored. TF-311 comes from the overlap phase of the PGW and NBP. By implication, therefore, it should be taken from the Early Phase of NBP.

Thus TF-311 reading 475 B.C. would date the introduction of NBP at Ahichchhatra. The implication would be that at Ahichchhatra the PGW did persist up to 475 B.C. As to its beginning, we are not on surer grounds as there are no ^{14}C dates for that PGW deposit which is devoid of NBP. However, since there is only one phase of pure PGW which is devoid of NBP immediately preceding the overlap phase of PGW and NBP, the beginning of PGW at the site on circumstantial grounds may be placed sometime between the 7th and 6th centuries B.C., at any rate not before 7th century B.C.

Mathura :

About this site we get the details from PRL Radiocarbon List I, 1977. These dates belong to overlap phase of PGW and NBP. In order to evaluate the respective position of these dates in respect to those for the succeeding deposit, the available, following two more dates from the NBP levels may also be considered.

MATHURA—A

1	2	3	4
PRL-339	NBP deposit	Charcoal. Trench MTR 8. Locus BI Qd.3, Pit 2, sealed by Layer 3. Rootlets removed.	500±100
PRL-340	NBP deposit	Charcoal. Trench MTR-8. Locus AI-Qd. 4, Layer 11. Depth 4.2 m. Rootlets removed.	510±150
PRL-333	NBP and PGW overlap	Charcoal. Trench MTR-8. Locus BI-Qd 2, Pit 3 sealed by Layer 5. Depth 3.18 m.	610±150

1	2	3	4
PRL-336	NBP and PGW overlap	Charcoal. Trench MTR-8. Locus BI-Qd. 2, Layer 6. Depth 3 m.	660±100
PRL-334	NBP and PGW overlap	Charcoal. Trench MTR-10. Locus AI-Qd. 4, Layer 9. Depth 1.45 m.	730±150

According to the above Date List samples PRL-334, PRL-336 and PRL-333 belong to the overlap phase of the PGW and NBP. These are consistent. Their validity can also be checked by TF-340 and TF-339 belonging to the succeeding deposit. This overlap phase on the basis of these dates could be placed between 700 B.C. to 600 B.C. The implication would be that at Mathura the PGW continued till 600 B.C. But it is difficult to pin point the initial date of the PGW in the absence of the necessary data. However, archaeologically, the position of the PGW and NBP at this site is fairly well defined. Period I, dated from *circa* 6th century B.C. to 4th century B.C., was divisible into two Sub-periods IA and IB. Sub-period IA represent that phase of PGW which is devoid of NBP. While in Sub-period IB, PGW overlaps with NBP without any major change. Period II corresponds with the Late Phase of NBP. There is no pre-PGW phase also. In view of all this, the beginning of PGW at the site could not be conjectured even on circumstantial basis.

In a recent article B.B. Lal (B.B Lal, *et al.*, 1980) has given the corresponding stratigraphic sequence of each radiocarbon determinations which he obtained from the excavator of the site, M.C. Joshi. The position in respect of the above samples (as given in chart Mathura-A) now is as follows :

MATHURA—B

1	2	3	4
PRL-339	Post-NBPW	×	500±100
PRL-340	PGW and NBP overlap	×	510±150
PRL-333	Late NBPW	×	610±150
PRL-336	Mid NBPW	×	660±100
PRL-334	Early NBPW	×	730±150

This new corelation has resulted in slight change in position. Sample PRL-339 giving a value of 500 B.C. for the post NBPW phase will have to be rejected out right. Likewise sample PRL-333 reading 610 B.C. for the Late Phase of NBP is also invalid. Samples PRL-336 and PRL-334 reading respectively 660 B.C. and 730 B.C. for the middle and early phases of NBP are consistent. This would place the beginning of NBP at Mathura around 700 B.C. In view of such an high date of NBP, sample PRL-340 which dates the overlap phase of PGW and NBP to 510 B.C. will have to be ignored. The beginning of the Early Phase of NBP at Mathura to 700 B.C. has nothing warranted to push the antiquity of the PGW. For culturally speaking, the late phase of PGW and the Early Phase of NBP remains indistinguishable in this region. Thus by implication on the basis of PRL-334 and PRL-340, the Early Phase of NBP or the late phase of PGW should be placed between 700 B.C. to 500 B.C. This also concides with the findings of M.C. Joshi and A.K. Sinha in their article, 'Chronology of Mathura, An Assessment', published in *Puratattva*, No. 10, (New Delhi, 1981), pp. 39-44, in which they have said that it is difficult to push back the antiquity of PGW at Mathura much beyond 600 B.C.

Khalaua :

We have three dates in respect of this site. One of them (PRL-1228) appeared in Radiocarbon, Volume 17, No. 2, 1975 and the other two dates (PRL-67 and PRL-68) occur in PRL ^{14}C Date List 11/1974. The information regarding these are given in the chart below :

KHALAUA

1	2	3	4
PRL-68	PGW and BRW deposits	Charcoal. Locus Khl-I, II to IV, Layer 8, Depth 2.35 to 2.48 m.	485±170
PRL-1228	PGW level	Charcoal. Locus Khl-L, II-IV (a), Layer 9, Depth 2.6 m to 2.75 m.	545±100
PRL-67	PGW and BRW deposits	Charcoal. Locus Khl-L-1, II/IV. Layer 7, Depth 2.5 m Rootlets removed.	570±160

The excavations at Khalaua revealed an occupational deposit of 3.45 m thick belonging to a single culture in which not only black-and-red and PGW co-occurs but a single sherd of NBP was also found in an upper horizon of predominantly PGW levels (c. f. *Puratattva*, No. 5, 1971-72, p. 33). Unlike other sites no independent horizon either of the black-and-red ware or of the NBP has been claimed at the site. So all these samples have been derived from a appreciable depth of the same cultural complex and are therefore dependable. So on the basis of these dates we can say that the chronological span of the PGW at Khalaua was from 600 B.C. to 500 B.C. In any case the PGW at this site cannot be put earlier than *circa* 600 B.C.

Batesvara :

We have five dates from this site the stratigraphical details of which are available from

PRL Radiocarbon Date list 11/1975. This is as follows :

BATESVARA

1	2	3	4
PRL—199	Pre-Mauryan or Mauryan Period (?)	Charcoal. Locus BTR2, A-2 Qd. 4. Layer 7A, Depth 3.10 m.	A.D. 1340±130
PRL—200	Transitional phase from BRW, PGW to Mauryan Period (?)	Charcoal. Locus. BTR 2, A-W. Qd 4, Layer 8, Depth 3.15 m.	3330±240
PRL—201	Period II deposit-Late Phase of NBP	Charcoal. Locus BTR 1, A-2 Qd-1, Layer 11, Depth 4.2 m.	640±160
PRL—197	Period II deposit-Mid Phase of NBP	Charcoal. Locus BTR 1, A-1 Qd 1, Layer 14, Depth 4.70 m.	530±110
PRL—198	Period I-Late Phase of PGW	Charcoal. Locus BTR I, A-2 Qd 3, Layer 19, Depth 6.65 m.	620±90

The comparison between cultural horizon and the corresponding radiocarbon determinations of TF-199 and TF-200 reveals that the former is far too young and the later is far too old. Hence these two may be rejected out right. The radiocarbon date for PRL-201 is also on the high side and is therefore unacceptable. The remaining two dates are consistent. Hence TF-198 reading 620±90 B.C. could provisionally date the lower limit of the late phase of PGW as this is the earliest deposit at the site. Culturally and stratigraphically this late phase of PGW (*i.e.* Period I from which this sample was derived) corresponds with the Early Phase of NBP and Period II of Batesvara with the Late Phase of NBP (*Supra*).

Atranjikhera :

In regard to this site we have six dates for PGW levels examined by TIFR, British Museum and Washington State University (WSU). The detail of TF-191 is published in Tata Institute Radiocarbon Date List III in *Radiocarbon* Volume 7, 1965. For TF-287 and TF-291 we get the details in Tata Institute Radiocarbon Date List IV, appearing in *Radiocarbon*, Volume 8,1966. Information regarding the dates from British Museum and WSU, has been obtained from B.B. Lal article (B.B. Lal *et al.*, (1980) published in *Puratattva*, No. 9, (1980), p. 73. In order to evaluate the relative position of these dates in respect to that of the preceding deposit we have also given two dates from the black-and-red ware phase of the site. On arranging the entire data, in our usual chart, we get the following :

ATRANJIKHERA

1	2	3	4
BM—193	PGW—NBPW	×	150±150
BM—194	PGW—NBPW	×	540±150
WSU	PGW—NBPW	×	530±154
TF—291	PGW deposit	Charcoal. Trench ARJ—4, Locus D I (SE). Layer 6, Depth 2.50 m—*Sample belong to Late levels.*	535±150
TF—287	P.G. Ware deposits (?)	Charcoal. Trench ARJ—4, Locus E2 (NW. Layer IY). Depth 1.34 m. *Visible Rootlets were handpicked. Site is disturbed by later floods. Sample seem to be later intrusion.*	A.D. 300±100
TF—191	PGW deposit	Charcoal. Trench ARJ—4—DI, top of SW corner. Layer 6. Depth 3.20 m.—*Sample belongs to PGW.*	1025±100
TF—415	Black-and-red ware deposits	From baulk between Trench EI-E2. Layer 8. Depth 0.5 m.	570±210
TF—289	Black-and-red ware deposits	Charcoal. Trench ARJ—4, Locus E9 (SW). Layer 4. Depth 0.95 m.	675±110

To proceed from top to downwards it may reasonably be argued that the overlap phase of PGW and NBP cannot be as late as 150 B.C. (BM. 193 reads 150±150 B.C.). Hence BM-193 may be ignored. BM-194 and WSU are consistent. They date the overlap phase of the PGW and NBP and consequently the Early Phase of NBP to about 530 B.C. The validity of their dates is checked by TF-291 reading 535±100 derived from the late levels of the PGW deposit which culturally and stratigraphically cannot be distinguished from the

Early Phase of NBP. In view of the validity of these three samples, TF-287 will have to be rejected outright. The laboratory report also speaks that the sample was collected from a deposit in which rootlets were visible and it was disturbed by later floods. Regarding TF-191 there is some controversy on its level of derivation. In the Tata Institute Radiocarbon Date List III, published in *Radiocarbon*, vol. 7, (1965), p. 291 (also see our chart above), the sample has been mentioned, as coming from merely 'PGW level'. This is to too vague to assess the exact level of its derivation. D. Mandal in *Radiocarbon Dates and Indian Archaeology*, (1972), p. 164, mentions that originally it was assigned to the earliest level of the PGW deposits but R.C. Gaur the excavator, in 1955 modified its level of derivation and assigned it to the Mid-phase of PGW. Now in the latest article of B.B. Lal we find that the sample has been derived from the lowest layer of Mid PGW (B. B. Lal, *et al.*, (1980), p. 73).The radiocarbon date of this sample reads 1025±110 B.C. The difference of 500 years in the dates of sample TF—191 (from the Mid phase) and TF—291 (from the late phase of PGW) does not reasonably explain the time taken by the intervening deposit of the two consecutive levels. This is certainly high as conceded by D. Mandal. The two dates, TF-415 and TF—289 from the pre-PGW horizon of the black-and-red ware deposit are also inconsistent in relation to TF—191 as dates for the lower deposit is younger than that of the upper one. So evaluating these three dates TF—191, TF—415 and TF—287, in larger stratigraphic profile, none of them appears to be dependable. However BM—194, WSU and TF—291 clearly show that at Atranjikhera the PGW overlapped with NBP in the 5th-6th centuries B.C. Since there is one more phase of PGW which is devoid of NBP below this overlap phase, which in turn is preceded by the black-and-red ware without iron, the beginning of PGW at the site may have definitely begun earlier than *circa* 6th century B.C.

Ganawaria :

For the PGW deposit at Ganawaria we have one date which appeared in PRL Radiocarbon Date List 11/1979. This reads 2790±110 B.C. which without any doubt can be rejected.

Sringverapura :

The three earlier cultural periods from bottom upwards at this site are : Period I dated from *circa* 1050-1000 B.C. (OCP), Period II dated from *circa* 950 to 700 B.C. (characterized by black-and-red and black slipped wares) and Period III dated from *circa* 700 to 250 B.C. (characterized by the use of NBP). While there was a break in occupation after OCP Period, there was no such break between Periods II and III. It is in the earliest Sub-period III A of Period III that we also get a few sherds of PGW along with NBP. Although there are no dates for this overlap phase of PGW and NBP but there are some dates from the immediately preceding Period II which gives an idea about the beginning of this overlap phase. The following is the relevant extract from B.B. Lal and K.N. Dikshit, 'Sringverapura; A key-site for the Protohistory and Early History of the Central Ganga Valley', *Puratattva*, no. 10, (1981).

"For the deposit representing Sub-period IIA, viz. layer 19 there is ^{14}C date of 2855, B.P. *i.e.* 905 B. C. which on MASCA correction comes to 960-1010 B.C. This Sub-period is therefore, ascribable to *circa* 950-900 B.C. For the next higher layer, viz. 18, representing the beginning of Sub-period III there are two dates : a TL date of 2743±300 B. P. and a ^{14}C date of 2700±130 B.P. While the former comes to 793 B.C., the latter on MASCA correction is 820-840 B. C. For a still higher layer, viz. 17, there are three TL dates, 2690±280 B. P.; 2769±400 B.P. and 2660±280 B.P. Since there is some more deposit above layer 17, the end of Sub-period IIB may be around 700 B.C. There is no break of occupation between Periods II and III. Hence the beginning of Period III, characterized by the first appearance of the NBP, may also be placed around 700 B. C.".

Since in this Early Phase of NBP, there also occur a few sherds of the PGW, the implication would be that at Sringverapura, the PGW cannot be dated earlier than 700 B. C.

We may now pass to one site in Madhya Pradesh viz. Kayatha.

Kayatha :

We have two dates for this site which are available in *Prehistoric Chronology and Radiocarbon Dating in India*, (1974), p. 136. These are tabulated below :

KAYATHA

1	2	3	4
TF—674	NBP deposit	KTH 4, Layer 11. Depth not given—yielded PGW and NBP.	470±100
TF—394	NBP deposit	×	495±100

These samples are derived from that phase which yielded both PGW and NBP. Naturally one would then think that this sample comes from the Early Phase of NBP. On the basis of these two radiocarbon dates the beginning of NBP and consequently the Early Phase of NBP at the site may be placed round about 500 B. C.

Since in the Early Phase of NBP we also get PGW, for the first time, the implication would be that at Kayatha the PGW cannot be dated earlier than 500 B.C.

We may now see what happens outside India. At Tilaurakot in Nepal we have one date which appeared in *Radiocarbon Dates and Indian Archaeology*, (1972), p. 234. This is tabulated below :

TILAURAKOT

1	2	3	4
TF-737	PGW are deposit	A2—A3, Layer 10. Depth 2.58 m.	350±95

The available information regarding the cultural horizon of the sample is too vague to assess its relationship with radiocarbon date. However it was derived from the earliest period of occupation (Period I) which was marked by the presence of not only PGW but also NBP. The ^{14}C date reads 350±95 B.C. Its validity also cannot be judged as there is only one date for the deposit. However the existence of PGW at the site round about 350 B.C. is indicated. But it is difficult to pinpoint the initial and the terminal limits for the ware on the basis of the published data.

2. CHRONOLOGY OF THE NORTHERN BLACK POLISHED WARE (NBP)

A. Archaeological Dating of NBP :

Perhaps not many of us know that Marshall was the first archaeologist who reported the occurrence of fine black lustrous sherds (now called NBP) at Bhita and he dated it to *circa* 8th century B. C.[1] But Codrington on the ground of unscientific method of digging at Bhita thought such an early date of NBP as untenable.[2] Later, Marshall again found specimens of NBP from the lower levels of Bhir mound at Taxila. This evidence later on played an important role in determining the archaeological time-bracket of the ware and the culture associated with it. In 1956, Wheeler and Deva not only published a list of eighteen NBP sites but dated NBP at Taxila from fifth century B.C. to the early part of the second century B.C. The central points in time and space for the ware according to them was thus (a) fourth century B.C. and (b) the Gangetic plain[3]. On the basis of internal evidence Lal dated NBP phase (Period III) at Hastinapura from *circa* 600-300 B.C. To substantiate this early dating of NBP by a century more than the original 500 B.C. date given by Wheeler and Deva he used Taxila and Kausambi evidences also[4]. Thus on the basis of Taxila, Hastinapura and Kausambi evidences the initial date of NBP was placed in the early sixth century B.C. This date has been questioned by some archaeologists like Gordon[5] and Wheeler[6] who instead prefer a date somewhere in the fifth-fourth century B.C.

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[1] *Annual Report Archaeological Survey India*, 1911-12, (Calcutta, 1915), pp. 80-81.

[2] L de B. Codrington, *Man*, (1929), no. 101.

[3] *Ancient India*, no. 1, (1946), pp. 56-58.

[4] *Ancient India*, nos. 10 and 11, pp. 22-23.

[5] D. H. Gordon in *Ancient India*, nos. 10 and 11. Also in *Antiquity*, (1957), vol. 31 and *The Prehistoric Background of Indian Culture*, (Bombay, 1960).

[6] R. E. M. Wheeler, *Early India and Pakistan*, (London, 1959), pp. 30-31 and also Wheeler, *Charsada*, (London, 1962), pp. 41-46.

Although D.P. Agrawal does not agree with Lal's argument of dating NBP at Hastinapura, Kausambi and Taxila on the basis of the depth of occupational strata but vagauely comes to the conclusion that NBP should be confined within *circa* 550-100 B.C.[1]. Sachidanand Sahay on the basis of Sonepur and Chirand evidences thinks that NBP was introduced in Bihar about the seventh century B.C., became popular around 5th-6th century B.C. and continued till 1st-2nd century B.C.[2]. Sahi on the basis of the identification of the alm bowls used by Gautam Buddha or the Buddhist monks with the carinated *handi* of NBP belonging to Late Phase of NBP, pushes the initial date of NBP to the pre-Buddha period by a century or so, at least, if not earlier[3]. This is probably the earliest date given to NBP and is in confirmity with the date proposed for this ware by Marshall in 1915. But the description of alm bowls as given by *Chullavagga* in its Fifth Khandhaka does not tally with the shape of the carinated *handi*. The carinated *handi* is not a bowl but a type of a cooking vessel often found with soot marks.[4] Secondly it occurs mostly in thick grey ware, thick NBP ware, red ware and rarely in fine NBP. In fact, I have yet to see a cooking *handi* in fine NBP fabric. If at all any comparison has to be made with the description of the alm bowls found in the above text it can be made with the lipped bowls. These have been reported both in the Early and Late Phases of NBP.[5] But this vessel also does not occur in fine NBP fabric. So despite these minor disagreements, half a millennium chronological span for the NBP was generally accepted by all.

Now more than eighty sites containing NBP or the assemblage associated with it have been excavated in India and abroad. And more than four hundred and fifty sites in India, Afghanistan. Pakistan and Nepal have produced this ware. Thus the ware now claims a larger area than any other known wares of India and also even greater area than the well known Harappa ware. This expansion in the area of its distribution has created a new problem. The relative less frequency of the ware in the outlying areas *i.e.* away from its supposed epicentre in the Middle Ganga Plain led scholars to think that one is not justified in giving a uniform date to all the NBP sites. Wheeler on the basis of Charsada and Udegram evidences gave the date of 320-150 B.C. for the NBP of the north-westerly region[6]. This evidence probably led him to assume that NBP at these sites and also at Taxila (very near Charsada) concided with the establishment of the Mauryan Empire. Subbarao could also see its movement in time and space from its epicentre in the Ganga Valley. But in the

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1. D.P. Agrawal, The Copper Bronze Age in India, (New Delhi, 1961), pp. 88-90.
2. Sachidanand Sahay, 'Origin and spread of the Northern Black Polished Wares', in B.P. Sinha, *Potteries in Ancient India*, (Patna, 1969), p. 148.
3. M.D.N. Sahi, Stratigraphical Position of the NBP ware in the Upper Ganga Basin and it Date, in *Puratattva*, no. 7, (1974), p. 9 .
4. *Ancient India*, nos. 10 & 11, p. 52.
5. See *A.I.* nos. 10 & 11, Type XXIV, p. 57 and *Excavations at Sravasti*, 1959, Fig. 9, Type XXVIII, and Fig. 15, Type XXII.
6. Wheeler, *Early India and Pakistan*, (London, 1959), p. 31.

linking of the spread of the NBP with the Mauryans, Wheeler was preceded by Y.D. Sharma. Thapar also observed that the spread of the NBP in the peripheral areas concides with the organized Mauryan Empire.[1] K.K. Sinha does not agree with this. He feels that the use of NBP in the Mid Ganges plain preceded the spread of the Mauryan Empire. If the ware spread due to Mauryan expansion, its near absence at Kumrahar (ancient Pataliputra) is unexplainable. On the other hand, Rajgir, a pre-Mauryan metropolis, produced NBP in large number. He further said that NBP occur in two contexts—one earlier (coming under primary distribution list) the other later (under secondary distribution group). The sites like Taxila, Vaisali, Sravasti, Rajgir and Kausambi comes under his primary distribution list and here its chronological span was between 500-300 B.C. The sites coming under secondary distribution list according to him, would include Hastinapura, Ropar, Ujjain and Kumrahar, where it cannot be dated earlier than 350 B.C.[2]

Our combined stratigraphical evidence at Sarai-mohana[3], Prahladpur[4] and Rajghat[5] clearly indicates the existence of NBP or the culture associated[6] with NBP in two clear cut-phases—one the Early Phase of NBP and the other Late Phase of NBP. On all these three sites of Varanasi District of which Prahladpur is the type site, the Early Phase of NBP (Sub-period I B) is preceded by black-and-red ware deposit (Sub-period I A) with very little of iron. In the Early Phase of NBP, NBP occurs in prolific number but some of the traits of the earlier deposits (black-and-red ware deposit) also continue in it and finally in the Late Phase of NBP, NBP continues in diminishing order alongwith the appearance of some new cultural traits and certain characteristic shapes in other wares. This was an evidence where we were confronted with two distinct phases of NBP at the same site. Hence it is not possible to include these sites exclusively either under Primary or Secondary distribution list of NBP. The evidence from Sravasti, Atranjikhera, Noh, Sugh, Sanghol, Banjarahi (Nepal) and Jakhera, where we get PGW along with NBP, was also of a new kind. This led us to examine the total assemblage associated with NBP not only from these sites but from all the excavated sites in India and abroad. As a result of this critical (*Supra*) survey we have come to the following conclusion.

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1. B.K. Thapar, 1955, 'A Chalcolithic site in the Tapti valley', *Ancient India*, nos., 20-21, p. 14.
2. K.K. Sinha, 'The NBP ware-Fresh Hypothesis in the light of Sravasti evidence', in *Potteries in Ancient India*, (Patna, 1969), pp. 174-184.
3. *I.A.*, 1967-68, pp.48-49.
4. A K. Narain and T.N. Roy, *The Excavations at Prahladpur*, (Varanasi, 1968), pp. 20-23.
5. A.K. Narain and T.N. Roy, *Excavations at Rajghat*, Part II, *The Pottery*, (VNS, 1977), pp. 21-45.
6. NBP is not itself a culture but it is definitely a dominant attribute of an Iron Age culture.

(1) It is clear that not only NBP but the cultural assemblage associated with it can be divided into two phases-one earlier called for the sake of convenience as the Early Phase of NBP and the other decidedly later in chronological span called as the Late Phase of NBP.

(2) One sites like Atranjikhera, Ahichchhatra, Mathura, Pariar, Noh and Jakhera the Early Phase of NBP is preceded by the PGW deposit. On other sites like Prahladpur, Rajghat, Sarai-mohana, Kausambi, Masoan, Sohagaura, Chirand, Sonepur, Rajgir, Ujjain and Nagda it is preceded by the black-and-red ware deposit. On certain sites like Sravasti, Khalaua, Sugh and Banjarahi it is the earliest deposit but the assemblage shows clear overlapping[1] of PGW and NBP. Although NBP is introduced in this phase but its production was on large scale. This Early Phase of NBP is characterized by the continuation of black-and-red ware and black slipped ware shapes and traditions in the eastern region and PGW along with its shapes in the western region. The structure of baked bricks and system of coinage are absent but iron objects are present. The important sites in which this phase is represented are Prahladpur IB, Rajghat IB, Sarai-mohana IB, Sravasti I, Atranjikhera IVA, Vaisali IA, Rajgir (Pre-structural phase) and Bhita (Pre-structural phase). But there are definite indications of this deposit at Kausambi (early levels of Period II), Sonepur (early levels of Period II), Taxila (Period I), Tripuri (Period I), Eran (Mid levels of Period IA), Besnagar (early levels Period III), Kayatha (early levels of Period IV) Awra II, Noh III, Sugh IA, Sanghol II, Mathura (early levels of Period II), Khalaua I, Tilaurakot (early levels of Period I) and Jakhera III. This Early Phase of NBP is largely coeval with Hastinapura PGW deposit *i.e.* Period II.

(3) The Late Phase of NBP or the assemblage associated with it on most of the sites precedes the Saka Kushan Period (called for the sake of convenience as the post-NBP Phase). The type sites of this phase are Prahladpur IC, Hastinapura III, Sravasti II, Navdatoli IV, Prakash middle and late levels of Period II, Atranjikhera IVB and Purana Qila, Mauryan and Sunga Periods. On some sites this has been described as structural phase of NBP (Bhita and Rajgir) while on others as defence phase (Sravasti and Balirajgarh). In this phase, the black slipped ware and black-and-red ware of the preceding Early NBP Phase totally disappears. The fine variety of NBP continues but its frequency is less. The characteristics potteries of this phase are coarse NBP (different in form and fabric with the fine NBP) and coarse grey ware (different in form and fabric from PGW). There was also considerable change in the typology of the vessels. As compared with the Early Phase of NBP, the production of bowls and dishes decreased but the production of basins and vases was on increase. In red ware, too, the most common shapes were pear-shaped vases (Ahichchhatra 10 A), nail headed and lipped basins, featureless or rimless *handis* and pans or *karahis* with loop or lug handles. Thus the shapes were mostly utilitarian. The only decoration noticed was the raised concentric bands on the inner side of the bowls and dishes of the coarse grey ware and coarse NBP. Sometimes they also had a central knob. On

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[1] This overlapping of PGW and NBP, is also noticed at Noh., Atranjikhera and Jakhera but here this is not the earliest deposit.

majority of sites there are definite indications of a better cultural prosperity. This is reflected with the introduction of structures of baked bricks, ring wells, drains and soakpits and fortifications. By far the largest number of NBP sites have yielded this type of deposit. Increase in the number of sites outside the Ganga Plains did show that NBP spread to the outlying areas during this phase. The excavations at Sravasti has thrown a valuable light on the stratigraphical dating of both of these phases of NBP. The earliest period at Sravasti (Period I or as we have called it as the Early Phase of NBP) has been dated from the middle of the 6th century B.C. to 300 B. C. This is characterized by the occurrence of PGW, NBP and large number of red ware shapes associated with red ware pottery of Hastinapura PGW phase (Period II). The other cultural material of Hastinapura PGW phase like terracotta discs, nail-parers, glass bangles, copper borers and iron also shows a remarkable similarity with the Sravasti I. Similar evidence has come out from Atranjikhera IVA, Noh III, Jakhera III, Sugh I A, where not only there is a overlap of PGW and NBP but the associated assemblage is similar with Sravasti I and Hastinapura II. If the proposed dating of Sravasti I is regarded as reasonable, consequently, it will date the beginning of NBP at all these sites to round about 600 B. C. This is in conformity with the dating evidence of Taxila and Kausambi. Similarly Period II of Sravasti, called post-NBP phase[1] (in which according to the excavator NBP does not occur) and dated from 300 B. C. to 50 B. C. is coeval with Hastinapura III (NBP phase), Prahladpur IC and Rajghat IC and Period II. On the basis of various cultural equipment like less number of fine sherds of NBP, coarse grey ware, structures of baked bricks, ringwell, drains, coinage and rimless carinated *handi* and pear-shaped vessels (Ach. 10 A) in red ware etc., the Hastinapura Period III is similar to the cultural assemblage of our Late Phase of NBP. On this basis, the Late Phase of NBP can be placed somewhere in between *circa* 300 B.C. to the beginning of the Christian era.

Thus the general stratigraphical testimony places the Early Phase of NBP from *circa* 600 B.C. to *circa* 300 B.C. and the Late Phase of NBP from *circa* 300 B.C. to the beginning of the Christian era. But if we accept the arguments given by M.D.N. Sahi the initial date of NBP can be placed somewhere in the 8th-7th century B.C.

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1. K.K. Sinha followed by D.P. Agrawal and Vibha Tripathi called Period II of Sravasti as post-NBP phase (See K.K. Sinha, *Excavations at Sravasti*, p. 15; Vibha Tripathi, *The PGW, An Iron Age Culture of Northern India*, p. 65 and D.P. Agrawal, *The Copper Bronze Age in India*, p. 87. But according to our study, Period II of Sravasti is Late Phase of NBP as not only NBP has been reported from this period (See K. K. Sinha, *op. cit.* p. 28, Fig. 5, Types 8 and 8A) but the over all assemblage of this period is similar with the Late Phase of NBP at Prahladpur (Sub-period IC) and other sites.

B. Date of NBP by Radiocarbon and other methods :

Let us now see how far the above archaeological date corresponds with the Carbon-14 and other dates of NBP deposit. D. P. Agrawal on the basis of 28 radiocarbon dates from the various NBP sites has suggested a chronological span for NBP from *circa* 550-50 B. C. But he has not given any chronological edge to the two phases of NBP nor he has examined the consistency of ^{14}C dates in relation to stratigraphy. Mandal's work contains more information as he has made the relative study of the two, ^{14}C dates and the stratigraphy. We shall, therefore. not only reexamine these dates in relation with the corresponding stratigraphical sequence but will try to see whether these are consistent with the time spread given to the Early and Late Phases of NBP on the basis of comparative stratigraphy. We shall begin with the sites of the Ganga Plains and then proceed to other regions.

Rajgir :

Two dates as given in the chart below, are available for this site :

RAJGIR

1	2	3	4
Laboratory Number	Period and its Archaeological Date	Phase or Layer from which the sample was derived and its archaeological date	Value in B. C. based on 5730 half-life
TF-45	Period I- NBP deposit. 600 B.C.	Layer 4, below the mud rampart, depth 7.05 m. Pre-Defence NBP Deposit	265±105
TF-46	Period I- NBP deposit. 600 B.C.	Pit 3 cut into Layer 5, below rampart, depth 8.7 m. Pre-defence NBP deposit	260±100

Rajgir Period I *i.e.* NBP deposit is divisible into two phases, the pre-defence and the defence. This pre-defence and defence deposits corresponds with the Early and Late Phases of NBP (*Supra*) respectively. From the chart it appears that both these samples were collected from the deposit just preceding the mud rampart *i.e.* they were derived from the end phase of the pre-defence deposit or from the beginning of the defence deposit. Consequently they will date the end of the Early Phase of NBP as well as the beginning of the Late Phase of NBP at the site. The ^{14}C determinations read 265±105 B.C. for TF-45 and 260±100 B.C. for TF-46. Both the dates are from the same level. *On the basis of these dates we can date the end of the Early Phase of NBP (Pre-defence deposit) or the beginning of the Late Phase of NBP (Defence deposit) at the site to round about circa third century B.C.*

Chirand :

We have only one sample TF-446 which reads 35±105 B.C. from the NBP deposit of this site. It is derived from the top levels of NBP deposit dated archaeologically to *circa* 100 B.C. The obtained ^{14}C date of 35 B.C., although slightly younger than the suggested stratigraphical date, no doubt, gives an idea thatthe NBP deposit at the site ended around the middle of the first century B.C. In the absence of other dates its validity cannot be checked. *However, it is a good example were the date proposed on archaeological ground for the end of the Late Phase of NBP near about the beginning of the Christian era is in confirmity with the date arrived by radicarbon method.*

Sohagaura :

Three samples as appeared in *Current Science*, September 5, (1978), Vol. 47, No. 17 and Agrawal's Table 5, ^{14}C Dates of Iron Age Sites have been published from this site. On arranging them in the following chart, the position is as follows :

SOHAGAURA

1	2	3	4
PRL-182	NBP Deposit	Charcoal from Trench ZB2, layer 9, depth 1.85m.	240±90
PRL-182A	—Do—	×	410±150
PRL-183	—Do—	Charcoal from Trench ZB2, layer 7, depth 1.4m.	590±110

The round term just 'NBP deposit' is too vague to assess the relationship between the archaeological estimate and the corresponding ^{14}C samples. However, the existence of NBP at the site from 600 B.C. to 240 B.C. is well attested. But it is difficult to find out the initial date of the Early Phase and the terminal date of the Late Phase of NBP on the basis of the available data.

Prahladpur :

From NBP deposit at the site we have no ^{14}C date. Yet on the basis of TF-186 derived from the preceding pre-NBP deposit we can have an idea of the beginning of the NBP at the site. The result of this sample was not published anywhere but when Secretary, Radio Carbon Dating Committee of the Tata Institute of Fundamental Research was contacted, he came out with the date. The extract from our personal correspondence published in, *The Excavations at Prahladpur*, (Varanasi, 1968), is reproduced below :

"TF-186 is your sample No. 1. It was a marginal sample as far as the weight was concerned. We have dated it, but due to technical reasons the age has a large accompanying error. The C-14 date of 5730 years half life value is TF-186, 2715±500 years".

PRAHLADPUR

1	2	3	4
TF-186	Sub-period IA-673 B.C. to 500 B.C.	Charcoal collected from Dump A, ascribable to Sub-period IA, pre-NBP phase	765±500

TF-186 show that the suggested archaeological date of 673 B.C. (round about 7th century B.C.) for pre-NBP deposit (Sub-period IA) at the site is younger by about 100 years than its corresponding ^{14}C determination of 765 B.C. (round about 8th century B C.). On this basis the beginning of the pre-NBP phase can be placed near about eight century B.C. NBP deposit or Sub-period IB essentially succeeds this pre-NBP deposit without any break and its beginning on archaeological ground has been placed to 500 B.C. We have no ^{14}C date for this phase. So all that can be done is a sort of computation of 100 years also in this case (as we have done in the case of pre-NBP deposit on the basis of the difference of ^{14}C and archaeological date). On this consideration the beginning of NBP and consequently that of the Early Phase of NBP at the site may provisionally be assigned to sixth century B.C. Although the sample has a large accompanying error but its validity in being more or less consistent with the corresponding archaeological date cannot be completely ignored.

Takiaper :

We have one date PRL-184 which reads 180±110 B.C. from this site which is relevant in the present context. This charcoal sample was derived from the burnt deposit (Layer 4) lying in between Period I (Early Phase of NBP) and Period II (post-NBP deposit). The Late Phase of NBP is covered by this burnt deposit which *inter alia* also denotes a break in occupation between Periods I & II. The ^{14}C date of 180 B.C. is, therefore, more or less consistent with the corresponding stratigraphic sequence.

Rajghat :

We have only one date for the NBP deposit (TF-293). But in order to evaluate the relative position of this date from the immediately preceding pre-NBP deposit the other date (TF-292) may also be considered.

RAJGHAT

1	2	3	4
TF-293	Sub-Period IA-600 B.C. to 400 B.C.	Layer 11, Depth 9.45 m, RGT-XI-Earliest Stratum of the Early Phase of NBP, dated to 600 B.C.	490±110
TF-292	Sub-Period IA-800 B.C. to 600 B.C.	Layer 6, Depth 5.9 m, RGT-Cutting IV-Extension-Top most Layer of Sub-Period IA, dated to 600 B.C.	470±100

Stratigraphically TF-293 belongs to the earliest level of Sub-period IB dated from 600 B.C. to 400 B.C. The ^{14}C date for this sample reads 490 B.C. which is slightly younger than the proposed date of 600 B.C. for the beginning of the Early Phase of NBP and *inter alia* that of Sub-period IB. TF-292 derived from another cutting of Rajghat belongs to the topmost layer of Sub-period IA dated from 600 B.C. to 800 B.C. It reads 470 B.C. which is also slightly younger than the proposed date of 600 B.C. for the end of the pre-NBP deposit and *inter alia* that of Sub-period IA. The difference of 20 years between the two ^{14}C dates is marginal probably because the corresponding strata to which they belong is more or less the same. The occupational deposit in between Sub-periods IA and IB was continuous and as such it is very difficult to pin-point that phase where the earlier Sub-period IA ended and the later IB started. Thus the ^{14}C date of about 500 B.C. derived from TF-293 for the beginning of the NBP deposit at Rajghat is not only valid but stand corroborated by the ^{14}C date of about 500 B.C. given by TF-292 for the end of the preceding deposit. Hence the initial date of the Early Phase of NBP as well as the terminal date for the pre-NBP deposit should be somewhere around *circa* 500 B.C. This is not far removed from the date of 600 B.C. proposed on stratigraphical ground for the Early Phase of NBP at Rajghat. For the Late Phase of NBP we have no ^{14}C dates.

Hetimpur :

Two dates are available from this site. Their ^{14}C date and the corresponding archaeological sequence is given in the chart below :

HETIMPUR

1	2	3	4
TF-176	×	Layer 4, depth 0.46m, HPR-IA^2-NBP Deposit	105±105 B.C.
TF-177	×	Pit B sealed by Layer 4, depth 1.2m, HPR-IA^2-NBP Deposit	A.D. 80±105

The ^{14}C date of A.D. 80 (TF-177) from the lower depth is younger than that from the higher one *i.e.* from TF-176 reading 105 B.C. Both these samples are from the same stratum of the same trench and hence their stratigraphic sequence should be more or less the same. But there is a difference of about 180 years in their corresponding ^{14}C dates. However, sample TF-177 is not dependable as it comes from the pit. Sample TF-176 is consistent with the dating of the Late Phase of NBP made on archaeological ground.

Kausambi :

Eight dates are available for this site. It is not only by far the largest ^{14}C dates available for any NBP site in India but it also supplies the stratigraphical details for each corresponding samples.

KAUSAMBI

1	2	3	4
TF-100	Period IV-*C.* 600 B.C. to the middle of the 1st century B.C.	Mid level of the Late Phase of NBP	275±100
TF-103	—Do—	—Do—	410±110
TF-104	—Do—	Late level of the Mid Phase of NBP-*C.* 275 B.C.	270±110
TF-105	—Do—	Late level of the Mid Phase of NBP	335+115
TF-225	—Do—	Mid level of the Mid Phase of NBP *C.* 325 B.C.	400±110
TF-226	—Do—	Mid level of the Mid Phase of NBP-*C.* 325 B.C.	220±110
TF-219	—Do—	Mid level of the Mid Phase of NBP-*C.* 350-275 B.C.	440±100
TF-221	—Do—	Early level of Mid Phase of NBP *C.* 400-350 B.C.	500±105

From the archaeological date supplied with the corresponding samples it appears that Mandal is inclined to demarcate the whole NBP deposit at Kausambi into three phases. According to him the ^{14}C dates for the Late Phase are not valid. But for Mid Phase, on the basis of four consistent dates (TF-104, 225, 219 and 221), he calculates the span from 500 B.C. to 270 B.C. *i.e.* to 230 years. The date of the Early Phase on extrapolation comes to *C.* 650 B.C. This is supported by B.B. Lal who also thinks that the beginning of the NBP at Kausambi may well go back to the seventh century B.C.[1] Although the Early Phase of NBP at the site has been extrapolated but on the basis of archaeological date supplied with the corresponding samples here also, we have two phases of NBP-levelled as Late and Mid Phases. The Mid Phase bracketed from 500 B.C. to 270 B.C. and the Early phase extrapolated to *circa* 650 B.C. both combined, probably corresponds to our Early Phase of NBP. For the Late Phase of NBP we have TF-100 which reads 275±100 B.C. This is supported by TF-104 reading 270±110 B.C. which comes from the immediately preceding levels.

Sringverapura :

The following is an extract from a paper "Thermoluminiscence dating of pottery from Sringaverapura, a Ramayana Site'' sent to me by R.K. Pant.

"The date for the black-slipped occupation of Sringaverapura is *C.* 790 B.C. This too seem to be fairly in order, allowing the same margin of error as in the case of OCP level which is datable to *C.* 980 B.C. Since the NBPW overlapped with the black slipped ware at Sringaverapura, the beginning of the NBPW may well go back to the time of the 8th century B.C.".

This site consequently dates the beginning of the Early Phase of NBP to 8th century B.C.

Batesvara :

BATESVARA

1	2	3	4
PRL-199	Pre-Mauryan or Mauryan	×	A.D. 1340±130
PRL-200	Transition from BRW, PGW to Mauryan	×	A.D. 3330±240
PRL-210	Late NBP	×	640±160
PRL-197	Mid NBP	×	530±110
PRL-198	Late PGW	×	620±90

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[1] B.B. Lal, in *Puratattva*, no. 9, (1980), pp. 77-78.

The ^{14}C dates given by samples PRL-199 and PRL-200 are respectively too young and too old and are, therefore, invalid. The date for PRL-210 is also not acceptable as the Late Phase of NBP can not be as old as 640 B.C. The remaining two samples are consistent and show that the beginning of the Early Phase of NBP at the site should be somewhere between 530 to 620 B.C.

Khalaua :

There are three dates for this site. TF-1228 is published in *Radiocarbon*, Volume, 17, No. 2, (1975) and the remaining two (PRL-67 and PRL-68) occur in PRL ^{14}C Date List 11/1974, Khalaua Series, U.P. The details of all these are tabulated below :

KHALAUA

1	2	3	4
PRL-68	PGW and BRW deposit	Layer 8, Trench KHL-I, Depth 2.35 m to 2.48 m.	485±170
TF-1228	PGW Level	Layer 9, Trench KHL-L, Depth 2.6 m to 2.75 m.	545±100
PRL-67	PGW and BRW deposit	Layer 7, Trench KHL-I, Depth 2.15 m.	570±160

The above chart show that samples PRL-68 and PRL-67 are derived from the PGW and black-and-red ware deposits and sample TF-1228 from PGW level. Khalaua is a one period site and hence all these samples came from the same deposit in which not only PGW and black-and-red ware are found but also NBP occurs.[1] The cultural equipments of this deposit also point that it is coeval with the Early Phase of NBP. While we do not know from which level of the deposit PRL-67 has come, all that can be said is that at Khalaua the Early Phase of NBP may well go back to the sixth century B.C.

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[1] NBP has not been reported in the description of Khalaua found in *I.A.*, 1965-66, pp. 41-42. But Y.D. Sharma, the excavator, while commenting at the seminar on NBP held at Delhi in 1971-72 (See *Puratattva*, no. 5, p. 33) mentioned that a single sherd of NBP was found in the upper horizon of the PGW levels at Khalaua.

Mathura :

According to Physical Research Laboratory ^{14}C Date List 1/1977, three samples belong to the overlap phase of PGW and NBP and six belong to the NBP deposit. By arranging these samples in the usual chart, we get the following :

MATHURA-A

1	2	3	4
PRL-343	NBP deposit	Layer 18, Trench MTR-11, Depth 4.2 m.	270±100
PRL-342	NBP deposit	Pit 8 Sealed by Layer 8. Trench MTR-8, Depth 3.65 m.	300±160
PRL-338	NBP deposit	Layer 18, Trench MTR-11, Depth 4.7 m.	400±110
PRL-337	NBP deposit	Pit 5 sealed by Layer 20, Trench MTR-11, Depth 5.45 m.	460±100
PRL-339	NBP deposit	Pit 2 sealed by Layer 3, Trench MTR-8.	500±100
PRL-340	NBP deposit	Layer 11, Trench MTR-8. Depth 4.2 m.	510±150
PRL-333	PGW and NBP Overlap Phase	Trench MTR 8, pit 3 sealed by layer 5, Depth 3.18 m.	610±150

1	2	3	4
PRL-336	—Do—	Layer 6, Trench MTR-8, Depth 3 m.	660±100
PRL-334	—Do—	Layer 9, Trench MTR-10,Depth 1.45 m.	730±150

Samples PRL-334, PRL-336 and PRL-333 belong to the overlap phase of the PGW and NBP and hence to the Early Phase of NBP. These are consistent The implication would be that at Mathura the Early Phase of NBP commence around 700 B.C. if not earlier. The remaining six samples are also consistent and their ^{14}C dates corresponds with the archaeological estimate. The available term just 'NBP deposit' regarding archaeological estimate of these six samples is vague to assess relationship of the two phases of NBP. However, according to ^{14}C dates of all the nine samples NBP at Mathura can be placed between 700 B.C. to 270 B.C.

In a recent article of B.B. Lal (B. B. Lal, *et al.*, 1980) the corresponding stratigraphic sequence of each sample as given by M.C. Joshi, the excavator, is as follows :

MATHURA—B

1	2	3	4
PRL-339	Post NBP	X	500 ± 100
PRL-343	Late NBP	X	270±100
PRL-338	Late NBP	X	400 ± 110
PRL-333	Late NBP	X	610±150
PRL-337	Mid NBP	X	460±100
PRL-336	Mid NBP	X	660±100
PRL-342	Early NBP	X	300±160
PRL-334	Early NBP	X	730±150
PRL-340	PGW and NBP overlap	X	510±150

B.B. Lal after giving valid reasons rejects samples PRL-339, PRL-333, PRL-342 and PRL-340 and presents a picture of the NBP deposit at Mathura in the following chart :

MATHURA—C

1	2	3	4
PRL-343	Late NBP	×	270±100
PRL-338	Late NBP	×	400±110
PRL-337	Mid NBP	×	460±100
PRL-336	Mid NBP	×	660±100
PRL-334	Early NBP	×	730±150

From the above chart the following picture emerges. The Late Phase of NBP starts from about 400 B.C. As to its end nothing definite can be said. As to the beginning of the Early Phase of NBP it will be reasonable to give a date of 700 B.C. if not earlier. In view of sample PRL-338 giving the value of 400 B.C. for the beginning of the Late Phase of NBP, the end of the Early Phase of NBP can be also fixed round about 400 B.C. But M.C. Joshi and A.K. Sinha in their recent article, 'Chronology of Mathura—An Assessment' in *Puratattva*, No. 10, 1978-79, (New Delhi, 1981), pp. 39-44, after rejecting samples PRL-333, PRL-336, PRL-339 and PRL-334 (as the material and the stratigraphy of the site go against these dates) felt that only seventeen sherds found in Period IB of Mathura were importep from the eastern U.P. and western Bihar (the place where they were originally produced) and hence they cannot be dated earlier than 500 B.C. Hence the date of PGW and consequently that of Period IA (which precedes the above Period IB) also cannot be pushed back beyond 600 B.C.

Atranjikhera :

In regard to this site we have seven dates from TIFR, two from British Museum and one from Washington University. Information regarding the dates and their cultural horizon from British Museum and Washington State University has been derived from B.B. Lal article "Did the PGW continue up to the Mauryan Times" published in *Puratattva*, No. 9, (1980), p. 73. By arranging all these dates we get the following :

ATRANJIKHERA

1 Laboratory Number	2 Period and its Archaeological Date	3 Phase or Layer from which the sample was derived and its Archaeological Date	4 Value in B.C. based on 5730 half-life
TF-195	Period IV- NBP Deposit	Layer 14, Depth 2.15 m, Trench ARJ-4-No Archaeological Date	A.D. 50±100
TF-194	Period IV- NBP Deposit	Layer 10, Depth 3.1 m, Trench ARJ-4-No Archaeological Date	530±85 B.C.
TF-283	Period IV- NBP Deposit	Layer 27, Depth 4.85 m, Trench ARJ-4-No Archaeological Date	260±105
TF-284	Period IV- NBP Deposit	Layer 29, Depth 5 m, Trench ARJ-4-No Archaeological Date	295±100
BM-193	PGW-NBP	×	150±150
BM-194	PGW-NBP	×	540±150
W S U	PGW-NBP	×	530±150
TF-291	Late PGW Deposit	×	535±100
TF-287	PGW Deposit (7)	×	A.D. 300±100
TF-191	Lowest layer of Mid PGW	×	1025±110

From the so called NBP deposit we have first four dates at the site. It is significant that all of them belong to regular stratum *i.e.* Layers 14, 10, 27 and 29 of the same trench ARJ-4. Barring TF-194, the remaining three are consistent and reasonably explain the life of that phase of NBP at the site which is devoid of PGW *i.e.* the existence of the phase from *C.* 300 B.C. to A.D. 50. One would then think that this explains the life span of the Late Phase of NBP at the site. The three dates BM-193, BM-194, and WSU, represent the phase of overlap between the PGW and NBP. This means that these sample comes from the Early Phase of NBP. BM-193 has to be discarded as according to the excavator, it comes from a disturbed deposit. BM-194 and WSU are consistent. They date the overlap phase of PGW and NBP and consequently the Early Phase of NBP to about 500 B.C. The validity of their dates is checked by TF-291, reading 535±100 B.C. which belongs to the Late PGW deposit which cannot be distinguished from the overlap phase of PGW and NBP. In view of the validity of these samples TF-287 has to be rejected outright. The laboratory report also speaks that the sample was collected from a deposit which was disturbed by later floods. TF-191 is of no relevance in our context but is given in the chart in order to evaluate the relative position of the above ^{14}C dates.

Ahichchhatra :

For the NBP deposit we have only two dates but in order to give an idea to the reader about the validity of these dates we have also given in the chart one date each from the preceding and succeeding phases of the NBP.

AHICHCHHATRA

1	2	3	4
TF-301	Period IV Kushan-Gupta Period	Phase II of the defences built in the beginning of Period IV-Beginning of Kushan-Period	370±105
TF-310	Period III-NBP deposit	Phase not mentioned. But Period III contained assemblage associated with the Late Phase of NBP	160±95
TF-311	Period III-NBP deposit	Overlap Phase of PGW andNBP	475±105

1	2	3	4
TF-317	Period II-Late Phase of PGW (?)	Late Phase of PGW (?)	270±105

TF-311 is from that phase of NBP which also contains PGW sherds. Hence it will date the beginning of NBP at the site and consequently the Early Phase of NBP. TF-310 came from that deposit which was devoid of NBP sherds but contained assemblage associated with the Late Phase of NBP. Hence it will date the Late Phase of NBP. This would show that although NBP had gone into disuse but the culture associated with NBP continued for some time more. This also shows that NBP is one of the diagnostic trait of a culture associated with the Late Phase of NBP. TF-301 has to be discarded as it was collected from the core of the defences which contained earlier material (PGW and NBP)[1] and hence it is not in keeping with the proposed archaeological date. TF-317 is also inconsistent with the corresponding stratigraphic sequence because according to laboratory report it belongs to disturbed strata. *The available evidence thus indicates that here also we have dates for two phases of NBP.*

Hastinapura :

The details of the three radiocarbon dates for NBP and three for PGW deposits are given in the chart alongwith their stratigraphic sequence.

HASTINAPURA

1	2	3	4
TF-80, 82	Period III C. 600 B.C. to *C.* 300 B.C.	End of Period III *i.e.* marking the end of NBP at the site - *C.* 300 B.C.	50±110
TF-81	—Do—	Upper most layer of Period III—*C.* 300 B.C.	125±100
TF-88	—Do—	Lower most layer of Period III-*C.* 600 B.C.	340±110
TF-83	Period II—*C.* 800 B.C. to *C.* 1100 B.C.	End of Period II *i.e.* Upper most Layer of PGW Deposit - *C.* 800 B.C.	335±110
TF-112	—Do—	—Do—	375±100
TF-90	—Do—	—Do—	385±110

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1. *Indian Archaeology*, 1963-64, A *Review*, (1967) p. 44.

Although there is a difference of 75 years in two dates available for the end of Period III, the difference is not much considering the nature of the archaeological dates given to a cultural period which are usually long. The date of 50±110 B.C. for TF 80, 82 seems to be more reliable as it represents a composite of two samples derived from identical stratum and depths marking the end of NBP at the site. Its date is more or less consistent with the stratigraphic date proposed by us for the end of the Late Phase of NBP. The date of 340±110 B.C. (TF 88) from the lowest layer of Period III (which marks the beginning of NBP at the site) is also valid in the context of three radiocarbon dates, reading 335±110 (TF 8[illegible]), 375±100 (TF 112) and 385±110 (TF 90), available for the end of the Painted Grey Ware deposit (Period II) at the site. This is also consistent with the date of 400-300 B.C. for the beginning of the Late Phase of NBP. Thus the beginning and the end of the NBP phase at Hastinapura on the basis of ^{14}C dates can be placed from 340 B.C. to 50 B.C. which is almost in agreement with the time-spread of 400-300 B.C. to the beginning of the Christian era as proposed by us. On the basis of the comparison of the associated assemblage we have already seen that Hastinapura Period III is coeval with Sravasti Period II which in turn represent the Late Phase of NBP. The radiocarbon dates being so younger than the archaeological estimate, no doubt, also prove this. Recently B.B. Lal[1] has said that the presence of rootlets in several samples show that the contamination must have been going on at the site through the ages and as such the samples are bound to give younger dates. This may or may not be only reason for these younger radiocarbon dates of Hastinapura. This is for the experts to think upon. Regarding his second point that there is good reason to suppose that there was substantial time-gap between the end of Period II (PGW phase) and the beginning of Period III (NBP phase) we have our own doubt. We have already pointed out that Period II of Hastinapura is coeval with the Early Phase of NBP and Period III with the Late Phase of NBP (*Supra*). The PGW phase and NBP phase *i.e.* Periods II and III are the rural and urban phases of the same Iron Age culture. Only a small portion of the whole settlement was abandoned for a very short time due to floods in the Ganga and hence there was no cultural gap.[2] The marked change in the cultural equipment of Period III did show that the stage for the rise of city was already set in the preceding PGW phase (Period II). In fact we have already said as early 1964-65 that[3] "All these minor changes do not bind us to postulate a gap of 2[illegible]0 years and to regard these two wares as a distinguishing factor in separating these two periods having different culture. "The customary division of the periods in the prevalent cultural schemes of the PGW and the NBP should now be changed. We cannot regard the PGW and the NBP as isolated phases representing different culture, at least, in the Ganges Valley".

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1. B.B. Lal, 'Did the PGW continue up to the Mauryan Times' *Puratattva*, no. 9, 1977-78, p. 65.
2. The evidence that the site was abandoned due to floods is available only at Hastinapura I. We do not get any such evidence at Hastinapura II.
3. T.N. Roy, 'Stratigraphical position of the PGW in the Gangetic Valley', *Bharati*, no. 8, part II, (1964-65), p. 68 and 75.

Purana Qila :

According to *Current Science*, Sept. 5, (1978), Vol. 47, only one date is available for this site. It is tabulated below :

PURANA QILA

1	2	3	3
PRL-97	Early Historic Deposit- NBP deposit	Locus PQL-N6 Qd. 2, Layer-48. Depth 10.35 m.	105±145

The round term 'Early Historic deposit or NBP deposit' is too vague to find out exactly from which period of the site the above sample was derived. From the published accounts of the excavation we find that NBP has been reported from both Mauryan as well as Sunga Periods of the site. In this context, however, one point deserve to be mentioned. On the basis of the cultural assemblage we find that Mauryan and Sunga Periods of this site is coeval with the Late Phase of NBP (*Supra*). *So the* ^{14}C *of 105 B.C. is consistent with the corresponding stratigraphic sequence and consequently with the Late phase of NBP.*

Allahapur :

Extract from PRL ^{14}C *Date List-July*, (1974) shows that one sample belongs to PGW and NBP overlaps phase and the second to PGW deposit. On arranging them in the chart below we get the following :

ALLAHAPUR

1	2	3	4
PRL-83	Sub-period IB- PGW and NBP Phase	×	275±100
PRL-81	PGW Phase	×	385±95

Sub-period IB not only yielded PGW and NBP associated red wares but also baked brick structures and a seal in late Mauryan characters. Hence it would be reasonable to ascribe this phase to the Late Phase of NBP *(Supra)*. Therefore, the ^{14}C date of 275 B.C. as derived by PRL-83 is consistent. The cultural equipment from which phase sample PRL-81 is derived contains, besides others, the red ware types which are reported from the PGW deposit of Hastinapur and hence it is coeval with the Early Phase of NBP *(Surpra)*. Hence its ^{14}C date of 385 B.C. is also valid provided we presume that the sample was derived from the late levels of the deposit. If it is so, the consistency of the two ^{14}C dates in relation to each other is also valid.

Ropar :

The site lies in East Punjab. Two dates are available.

ROPAR

1	2	3	4
TF-213	Period III- 600 B.C. to 200 B.C.	Layer 26, Depth (?) PRL-I, NBP deposit.	390±105
TF-209	—Do—	Layer 30, Depth 11. 4m. PRL-2-Early level of NBP deposit.	485±100

The comparison between the corresponding archaeological estimate of TF-209 and its ^{14}C date of 485 B.C. reveals that both are consistent. Such a comparison is not possible in case of TF-213 because its specific stratigraphic phase is not available. Nevertheless, these dates indicate the early beginning of NBP at the site. But this creates difficulty when we examine the total cultural assemblage of the NBP deposit (Period III) at the site. The cultural material of Period III definitely indicate that it is coeval with the Late Phase of NBP.

Noh :

For sites in Rajasthan we have only one date from the NBP deposit of Noh. But in order to evaluate its position dates from the preceding PGW deposit is also tabulated below :

NOH

1	2	3	4
TF-994	×	Early NBP Deposit.	685±105
TF-1144	×	Late PGW Deposit.	490±90
UCLA-703A	×	Mid PGW Deposit.	605±260
TF-993	×	Mid PGW Deposit.	725±150
UCLA-703B	×	Mid PGW Deposit.	820±225

The last three dates for the Mid PGW deposit are consistent. Inconsistency, however, exist between TF-1144 and TF-994 belonging respectively to the late PGW and Early NBP Phases. According to excavator of the site these two samples belong to disturbed stratum. But since the ^{14}C dates of the immediately preceding deposit (PGW) are consistent and could range from 800 B.C. to 600 B.C. (on the basis of UCLA-703B, TF-993 and UCLA-703A), the Early Phase of NBP cannot be placed later than the sixth century B.C.

Kayatha :

We have two dates[1] for this site which are tabulated below :

KAYATHA

1	2	3	4
TF-674	NBP deposit	×	470±100
TF-394	NBP deposit	×	495±100

These samples were derived from Period IV dated from *circa* 600 B.C. to 200 B.C. This period yielded both PGW and NBP and hence one can presume that these samples comes from the Early Phase of NBP. On the basis of their ^{14}C dates, the beginning of the NBP and consequently the Early Phase of NBP at the site may be placed round about 500 B.C.

Besnagar :

The site is in Madhya Pradesh. Formerly we had two dates (TF-387 and TF-254) but now one more date (PRL-283) is available.

BESNAGAR

1	2	5	4
TF-387	Period III	Layer 8, Depth 3.5m BSN-4-NBP deposit	470±100
TF-254	—Do—	Layer 8, Depth 2.7m BSN-1-Early Phase of NBP	295±110
PRL-283	—Do—	NBP Deposit	310±140

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[1] D.P. Agrawal and Sheela Kusumgar, *Prehistoric Chronology and Radiocarbon Dating in India*, (New Delhi, 1974), p. 136.

There is not of much difference between ^{14}C dates of the last two samples. But there is a difference of more than 150 years between the ^{14}C dates of the first and the last two samples. Archaeologically TE-254 belong to Early Phase of NBP. So its ^{14}C date of 295 B.C. does not correspond with the stratigraphic sequence unless we presume that the sample was derived from the top deposit of the Early Phase of NBP. Similarly ^{14}C date of 470 B.C. foı TF-387 cannot be treated as valid unless we presume that it was collected from the layers belonging to the Early Phase of NBP. Under the circumstances it is difficult to demarcate clearly the two phases of NBP. However, their indication cannot be ruled out. Similarly it is also difficult to demarcate two phases of NBP in Period III (NBP deposit) at Besnagar on the basis of the total cultural assemblage.

Ujjain :

This site also belongs to Madhya Pradesh. Only one date TF-409 which read 450±95 B.C. is available from this site. The sample was derived from Layer 28 at the depth of 5.5 m from Period II (NBP deposit) dated on archaeological ground from 500 B.C. to 200 B.C. The phase to which it belongs has not been reported. Also it is a solitary ^{14}C date from this site. Hence its consistency with the proposed archaeological date of 500 B.C. for the beginning of NBP at the site can only be held valid if we presume that the sample was derived from the early layers of the Early Phase of NBP.

Amravati :

We have two dates from this site which are published in *Current Science*, Sept. 5, 1918, Vol. 47, No. 17. The information regarding them is arranged in the following chart :

AMRAVATI

1	2	3	4
PRL-157	NBP Deposit (?)	Charcoal from Trench YA-1/3, Layer 10 A, Depth 4.2 m.	200±100 A.D.
PRL-158	NBP Deposit (?)	Charcoal from Trench YA-3/4, Layer 12, Depth 3.75 m.	20±110 A.D.

Sample PRL-157 giving a date of 200 A.D. for the NBP deposit will have to be rejected outright as even the end of the Late Phase of NBP cannot be ascribed to 200 A.D. *PRL-158 reading a date of 20 A.D. may be valid as the Late Phase NBP might have continued even up to 20 A.D. at this outlying site.*

Charsada : (West Pakistan)

We have two dates from this site which are arranged in the following chart as usual :

CHARSADA

1	2	3	4
UW-78	NBP Deposit	X	50±70
UW-77	NBP Deposit	X	270±60

Both these dates are consistent as they belong to a site which was in the outlying area of NBP. ^{14}*C dates are therefore consistent with the date of the Late Phase of NBP arrived on archaeological ground.*

3. Summary and Conclusion :

In the foregoing pages we have made an assessment of the data in respect of excavated sites which have yielded PGW and NBP and for which dates based on comparative stratigraphy as well as radiocarbon dates were available. For thus alone a comparison between the archaeological dating and the corresponding determinations could be made.

In so far as the PGW was concerned, the proposed chronology of *circa* 1100-800 B.C. by B.B. Lal, about three decades ago, was either accepted or criticized by scholars. As to its initial date, A. Ghosh in 1978 posed a question. 'What is the earliest date of the ware and how much reliance can be placed on the high dating of the eleventh century B.C. arrived at by some archaeologist on circumstantial evidences and later on supported by ^{14}C measurements of a single specimen from Atranjikhera, the same method has yielded much younger dates for the specimens from other sites' ? As to its upper limit, D.P. Agrawal and others in 1978, pushed it to 300 B.C. which lent an indirect support to the point raised by K.N. Dikshit in 1973 that the PGW continued without any change up to the Mauryan times. It may be recalled that in 1964-65, in my article, 'Stratigraphical Position of the PGW in the Gangetic Valley' we had pointed out that such a slow evolution in the material equipments of PGW and NBP levels of Hastinapura could not force one to imagine a long gap of 200 years. On the other hand we tried to make out a case for bringing PGW levels more close chronologically to NBP and vice-versa: It was further stipulated that PGW and NBP deposits belong to the same cultural group. Hence this type of site-wise analysis of the chronological date was thus called for. The evidence obtained from each of the sites discussed above may be summarized as follows :

In India, PGW is reported from northern and eastern Rajasthan, Punjab, Haryana, Madhya Pradesh (e.g. Besnagar, Barata and Kutwar), western U.P. eastern U.P. (e.g. Kausambi and Sringverapura) and north Bihar (e.g. Vaisali). Its discovery at Thapli in the Himalayan region of Garhwal has proved that it did penetrated to the mountain region. In Pakistan it has been found at Harappa in Punjab, Lakhiyo Pir in Sind and in the erstwhile Bahawalpur State. But it must be noted that except a few sites almost all these regions have produced PGW wholly insignificant in number and quantity.

At Manda, plain grey ware of the PGW complex of northern India belongs to late Harappan horizon. We have eight sites in Punjab. At Nagar and Katpalon in District Jullundur of Punjab, the earliest period was represented by PGW culture but there was a sprinkling of the late Harappan ware, thus, indicating the interlocking of the two cultures. Dadheri and Sanghol in District Ludhiana gives a similar stratigraphical context of the PGW but with a difference. At these sites baked bricks are associated with PGW culture. Ropar in District Ambala, revealed a hiatus between Harappan and PGW deposits. The PGW which essentially precedes the Late Phase of NBP at this site cannot be placed as early as other sites of Punjab. At Sugh, another site in the same District of Ambala, PGW has been reported along with NBP in Sub-period IA dated from *circa* 600-500 B.C. Hence here the PGW has not been placed earlier than *circa* 600 B.C. At Ghuram in District Patiala, Period IA dated from *circa* 6th to 4th centuries B.C. is represented by plain grey ware of medium to fine fabric, types being bowls and dishes. Period IB dated from *circa* 4th century B.C. onward is characterized by NBP. Some PGW and Late Harappan sherds are however reported from the surface of the mound. Archaeological excavations at Mahorana, District Sangrur, Punjab, in March, 1982 yielded PGW along with iron and black slipped ware in Period III dated from 800 to 400 B.C. The site revealed a long gap between the Harappans and the PGW deposits.

In Haryana we have four excavated sites which have yielded PGW. Bhagwanpura, Raja Karan Ka Qila and Kasital in District Kurushetra and Autha in District Gurugoan. At Bhagwanpura, the phenomenon of the overlap of the late Harappan and PGW cultures has been placed by the excavator, J.P. Joshi, between *circa* 1600 B.C. to 1000 B.C. But here also like Dadheri and Sanghol (both in Punjab) PGW co-occurs with baked brick structures. Raja Karan Ka Qila, another site in the same District of Kurushetra in which Bhagwanpura lies, have a different story to offer. Here there was no overlap of the late Harappan and the subsequent culture. On the other hand it yielded the grey ware in lowest level which was occasionally painted on the rim. This phase has been assigned a date of *circa* 400 B.C. or even later. At Kasital, PGW has been reported from Period I along with a sherd of black-and-red ware and Ahichchhatra 10 A type and rimless *handis* in red ware. The other note-worthy find of this period was a circular barn of 2.05 m in diameter. The occupational deposit of Period II was disturbed by pits and belongs to early historical times. Shapes like Ahichchhatra 10A, carinated *handis* and barns are associated with the Late Phase of NBP and cannot be dated earlier than 400 B.C. Hence PGW at this site cannot be dated earlier than 400 B.C. The earliest occupation (Period I) at Autha was represented by PGW which overlapped with the succeeding Period II, characterized by the deposit of the Late Phase of NBP.

Now we pass on to the site in Rajasthan. Here only four PGW sites viz., Noh, Jodhpura, Bairat and Sardargarh have been excavated. At Noh and Jodhpura, PGW deposit is comparable with Hastinapura and other sites of the Ganga Plain but added a new factor in so far as it overlaps with NBP and demonsttrated the occurrence of black-and-red ware phase between the OCP and PGW deposits. Hence here the PGW can be dated earlier than Hastinapura. The PGW at Bairat has been reported from Period I but it continues with NBP in Period II. Since here there is no pre-PGW phase it may be more or less contemporary with Hastinapura. At Sardargarh in District Bikaner, the earliest habitation was that of the PGW. After this the site was deserted until it was reoccupied by Rang Mahal culture. Stratigraphically no date could be assigned to a PGW deposit found in such a sequence.

We have two sites in Uttar Pradesh Himalayan region of Garhwal, Ranihat near Srinagar and Mordhwaj, 13 km. south-west of Kotdwara. Ranihat, Period I, constituting the earliest level, yielded fine unpainted grey ware along with glossy red ware. This plain grey ware in form and fabric according to the excavator, N. P. Nautiyal, is same as that of the PGW of Hastinapura, Period II. This period has been dated from *circa* 600-500 B.C. to 400 B.C. Sub-period IIA with NBP dated from *circa* 400 to 200 B.C. corresponds with the Late Phase of NBP at Hastinapura Period III. Hence the antiquity of the PGW at this site cannot be pushed beyond 600 B.C. In Moradhwaj, Period I, dated from *circa* 5th century B.C to 2nd century B.C., sherds of fine thin grey ware are reported along with NBP and structures of baked bricks. These thin grey ware are not painted but they belong to the same fabric as that of PGW. Here they co-occurs with NBP and baked brick structures and hence their context is quite late.

Now we come to the PGW sites of the Ganga Plains. We will start our survey with Hastinapura because the date of PGW was fixed mainly on the basis of the archaeological date of *circa* 1100 B.C. to 800 B.C. proposed for Hastinapura PGW deposit. But since the publication of Hastinapura report in 1954-55, five factors, relevant in the present context, have come to light. Firstly a distinct deposit of black-and-red and black slipped wares phase below the PGW deposit on sites like Atranjikhera, Jakhera, Pariar, Noh and Jodhpura. Secondly a distinct deposit of black-and-red and black slipped wares immediately preceding the Early Phase of NBP on sites like Chirand, Sonepur, Prahladpur, Rajghat, Kausambi and Sringverapura. Thirdly overlap of PGW and NBP on several sites. Fourthly contemporeniety of the PGW and Early NBP on the basis of the late radiocarbon dates for PGW and early ^{14}C dates for NBP. Fifthly culturally speaking we find that PGW phase and Early NBP Phase of the Ganga Plains remain indistinguishable from each other.

So we have now to date the Hastinapura in the light of these added evidences. The cultural material associated with PGW deposit of Hastinapura (Period II) like pottery, terracotta discs, bone points, nail-parers, vase-shaped beads of terracotta, copper borers and iron objects etc. show a remarkable similarity with the Early Phase of NBP of the Middle

Ganga Plain. They also belong to same time plane as both these deposits stratigraphically precedes the Late Phase of NBP and succeeds the black-and-red and black slipped wares deposit. Since the Early Phase of NBP cannot be dated earlier than 7th-6th centuries B.C. hence the PGW at Hastinapura also cannot be placed earlier than 7th-6th centuries B.C. This underlying homogeneity in the cultural constituents of the PGW phase of the Upper Ganga Plain with the Early NBP Phase of the Middle Ganga Plain, puts the PGW phase of the Ganga Plains on a different footing than its counterpart in the Ghaggar (Sarasvati), Drisadavati (Chautang) and Sutlej basins. If we look round whole of Upper Ganga Plain we will find that there are two types of PGW sites. Sites like Hastinapura, Allahapur, Alamgirpur, Hulas, Sravasti, Ahichchhatra, Mathura, Sonkh, Batesvara, Khalaua, Kampil and Kanauj do not give the evidence of any pre-PGW deposit. So the PGW deposit on these sites on the basis of the archaeological date proposed for Hastinapura also cannot be dated earlier than 7th-6th centuries B.C. In the second category are sites like Atranjkhera, Pariar and Jakhera (also Noh and Jodhpura, the sites of Rajasthan) which revealed a distinct pre-PGW horizon of black-and-red ware, however, can be dated earlier than *circa* 700 B.C. How much early is a matter of computation ? We are not able to elaborate it further in view of the paucity of data.

We may now see what is the stratigraphical position of the PGW in Madhya Pradesh. At Ujjain, the PGW was known before or at the time of the erection of the rampart round about 700 B.C. At Jaderua, plain grey ware recalling the fabric of the PGW are reported in the context of sixth-fifth centuries B.C. At Kayatha, again the plain grey ware similar in fabric with the PGW has been reported along with NBP in the level assignable to *circa* 600 B.C. The most significant evidence comes from Besnagar. At this site PGW has been reported from the upper levels of the chalcolithic deposit but it also continues in the succeeding pre-NBP phase. So here its beginning can be placed in the later phase of the chalcolithic culture dated on the basis of radiocarbon dates to round about 1400 B C. In fact on this evidence and several other grounds M.D.N. Sahi is inclined to see the genesis of the PGW in the central Indian chalcolithic cultures.

We may now look as to what happened outside India. There are two PGW sites in Nepal viz. Banjarahi and Tilaurakot which were excavated. At Banjarahi the PGW was found in Sub-period IA, the earliest period of occupation, along with NBP. Sub-period IB was marked by the presence of NBP in abundance. Hence the context of PGW is late at this site as it is indistinguishable from the Early Phase of NBP. Tilaurakot also has a similar story to offer. Here also the PGW occurs along with NBP in the earliest period of occupation dated on stratigraphical grounds to *circa* 600 B.C.

In respect of all those sites which have yielded ^{14}C dates, the position can be summarized as follows :

At Noh in Rajasthan, the earliest uncalibrated date of the PGW on the basis of UCLA-703B would not antedate 800 B.C. There is no disagreement about its upper limit which may be placed by about 500 B.C. Inspite of discrepencies in ^{14}C dates of Jodhpura, the earliest date of PGW at the site, on the basis of PRL-272, which reads 800±150 B.C. does not go beyond 800 B.C. But this site has given some dates (PRL-223 and PRL-273) which take the end of the PGW up to *circa* 300 B.C.

In respect of Hastinapura in Uttar Pradesh we have three dates 375±100 B.C., 390±115 B.C. and 335±115 B.C., all derived from the uppermost deposit of the PGW. Hence the end of the PGW phase at Hastinapura can be placed somewhere around 350 B.C. This is also in agreement with TF.88 reading 340±115 B.C., which belongs to the succeeding NBP phase. This evidence does not favour in postulating a long gap of 200 years between the end of the PGW and NBP deposits. We have two dates for the late phase of PGW, viz. 550 B.C. and 570 B.C. which are consistent. For the middle and early PGW levels we have no dates. Some idea, however, may be formed by applying Lal's own reckoning of three centuries for a deposit of 2.1 m (7 ft) at the site. If we add 300 years to 350 years (this being the uppermost limit of the PGW), we get a date of 650 B.C. for the beginning of the PGW deposit at Hastinapura. Thus on this computation the entire PGW deposit at the site can be placed from *circa* 650 B.C. to 350 B.C. On the basis of two dates 385±95 and 275±110, the end of Sub-period IA and the beginning of Sub-period IB at Allahapur could be placed between 400 to 300 B.C. This is consistent with the date of 350 B.C. proposed for the beginning of the NBP phase at Hastinapura. For culturally, Sub-period IB of Allahapur is coeval with Hastinapura III. Recently in 1980 Lal has doubted the occurrence of PGW along with baked brick structures in Sub-period IB of Allahapur. However, baked brick structures not only co-occurs with PGW at Allahapur but also at Dadheri, Kasital, Sanghol, Bhagwanpura and Jakhera. The one date of A.D. 860±100 from Alamgirpur is erratic and hence can be out right rejected. TF. 34, reading 475 B.C. comes from the overlap phase of the PGW and NBP at Ahichchhatra. By implication it should be taken from the Early Phase of NBP and hence it would date the introduction of NBP at Ahichchhatra. Consequently PGW at the site persisted up to 475 B.C. As to its beginning we are not on surer grounds as there are no ^{14}C dates for that PGW deposit which is devoid of NBP. The beginning of the Early Phase of NBP (PGW and NBP overlapped phase) at Mathura to round about 700 B.C. (on the basis of PRL-334 reading 730±150 B.C.) has nothing warranted to push the antiquity of the PGW. For there is not much of PGW deposit below the overlap phase of the PGW and NBP and secondly culturally speaking the PGW and the Early Phase of NBP (PGW and NBP) remain indistinguishable in this region. The chronological span of the PGW deposit (in which a single sherd of NBP has been also reported) at Khalaua, on the basis of 570±160 B.C., 545±100 B.C. and 485±170 B.C. can be placed from 600 B.C. to 500 B.C. TF. 198 reading 620±90 B.C. from Batesvara also supports such a view. It is needless to point out the level of controversy on TF. 191, reading 1035±110 B.C., derived from the PGW phase of Atranjikhera. However, BM-194, WSU and TF.291 clearly show that at Atranjikhera, the PGW overlapped with NBP in the 6th-5th centuries B.C. Since there is one more phase of PGW below this overlap phase of PGW and NBP, the beginning of PGW at the site may have definitely begun earlier that *circa* 6th century B.C. The date from Ganawaria reading 2790±110 B.C. has to be ignored. Although there is no date for the overlap phase of PGW and NBP from Sringverapura but from three thermoluminescence dates of 2769±900 B.P., 2690±280 B.C. and 2660±280 B.P. (derived from the immediately preceding Sub-period II) which on conversion comes to 819, 740 and 710 B.C. respectively, the beginning of the PGW and NBP overlap phase has been very well dated to 700 B.C. Since in this overlap phase, a few sherds of PGW are also reported, the implication would be that at Sringverapura the PGW cannot be dated earlier than 700 B.C.

For Kayatha in Madhya Pradesh, we have two dates 470±100 and 495±100 B.C., from that phase which yielded both PGW and NBP. The implication would be that at Kayatha the PGW cannot be dated earlier than 500 B.C.

For Tilaurakot in Nepal, we have one date 350±95 B.C. derived from the earliest period of occupation which was marked by the presence of both PGW and NBP. Its validity cannot be judged as this is a single date from this deposit. However, the existence of PGW at the site to round 350 B.C. cannot be ruled out.

Combining the data based on comparative stratigraphy and radiocarbon determinations in respect of all the excavated sites which yielded PGW, we come to the following provisional conclusions :

1. PGW by itself cannot be regarded as a safe criteria for dating. Because it is found to occur in different context. The excavations at some sites in Punjab and Haryana revealed a non-iron PGW complex which interlocks with a late material derived from Harappan and pre-Harappan strains. At Besnagar in Madhya Pradesh part contemporaneity of the PGW with the later phase of the chalcolithic culture is suggested. On other sites all the PGW deposists are associated with iron. On the basis of comparative stratigraphy and radiocarbon dates the lower limit of the PGW at sites like Noh, Jodhpura, Atranjikhera, Pariar and Jakhera (where the PGW deposit is preceded by a distinct phase of black-and-red ware) can be assigned to round about *circa* 800 B.C. But sites like Hastinapura, Allahapur, Alamgirpur, Hulas, Sravasti, Ahichchhatra, Mathura, Batesvara, Khalaua, Kampil and Kanauj etc., which do not give the evidence of any pre-PGW black-and-red ware phase, cannot be dated earlier than seventh-sixth centuries B.C. We have yet another context of PGW which is very late. This is noticed at Dadheri, Kasital, Sanghol, Bhagwanpura, Moradhwaj, Allahapur and Jakhera where the PGW co-occurs with structures of baked bricks. The ^{14}C dates from Jodhpura, Hastinapura, Allahapur and Tilaurakot in Nepal did suggest that PGW continued up to 350 B.C. So one is not justified in assigning a uniform date to all the PGW.

2. There is no convincing ground to believe that PGW moved in time and space. There is thus PGW at Bhagwanpura belonging to *circa* 1600-1000 B.C. but at the neighbouring sites of Raja Karan Ka Qila and Kasital (these two sites are also found in the same District of Kurushetra in which Bhagwanpura lies), the ware has a much later datable horizon. Similarly

we have PGW at Besnagar belonging to the late phase of the chalcolithic culture datable to round about 1400-1300 B.C. but at Kayatha, Ujjain and Jaderua it has a much later datable context. So it appears that we cannot group the PGW sites in a time-bracket based on space movement.

3. Before coming to any conclusion regarding the different chronological horizons or the cultural stages of the PGW, one should look to all the associated material. The underlying homogeneity in the cultural constituents of the PGW phase of western U.P. with the Early Phase of NBP of eastern U.P. and Bihar, puts the PGW phase of the Ganga Plain on a different footing than its counterpart in other regions.

In so far as the NBP was concerned, now more than eighty sites containing NBP or the assemblage associated with it have been excavated in India and abroad. And more than four hundred fifty sites in India, Afghanistan, Pakistan and Nepal have produced this ware. In India, the ware is reported from Charsada and Taxila (now in Pakistan) in the north-west to as far as south as Karod (?) and Amravati. Eastward it has been obtained from Tamluk in Midnapur District, from Bangarh in Dinajpur and from Gaur in Malda. On the west it occurs at Prabhas Patan near the western coast in Gujarat. Thus the ware now claims a larger area than any other known wares of India and also even greater than the well known Harappa ware. This expansion in the area has created new problem. The relative less frequency of the ware in the outlying areas *i.e.* away from its supposed epicentre in the eastern U.P. and Bihar led scholars to think that one is not justified in giving a uniform date to all the NBP sites. Our foregoing critical survey (See Chapter II) showed that the NBP Period can be divided into two[1] phases-one earlier, called for the sake of convenience as the Early Phase of NBP and the other decidedly later called as the Late Phase of NBP. The combined dates based on comparative stratigraphy from all the sites discussed above places the Early Phase of NBP from *circa* 700-600 B.C. to *circa* 400-300 B.C. and the Late Phase of NBP somewhere in between 400-300 B.C. to 100 B.C. or to the beginning of the Christian era. But if accept the arguments given by M.D.N. Sahi the initial date of NBP can be placed somewhere in the 8th-7th centuries B.C. Let us see how far the above archaeological dates given by us to these two phases of NBP, corresponds with the ^{14}C and othe dates from NBP Period. It may be recalled that the published stratigraphical data for the corresponding samples are not enough. Most of the sites provide with only a vague term like 'NBP Period' or 'NBP deposit' without indicating the phases. However careful observation reveal the following :

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[1] D. Mandal, while determining the time-bracket for the NBP deposit at Kausambi is inclined to see three phases in it instead of two. See D. Mandal, *Rodiocarbon Dates and Indian Archaeology*, (Allahabad, 1972), pp. 181-185. B.B. Lal and K.N. Dikshit also divides Period III of Sringverapura, characterized by the use of NBP into three sub-periods, A, B, and C. See B.B. Lal and K.N. Dikshit, Sringverapurpa : A key site for the Protohistory and Early History of the Central Ganga Valley; *Puratattva*, no. 10, (New Delhi, 1981), pp. 4 & 7. *We may, however, await more specific details from these two sites and corroborative* evidence *from other sites in this regard.*

At Rajgir, Period I *i.e.* 'NBP deposit' is divisible into two phases, the pre-defence and the defence corresponding with our Early and Late Phases of NBP. TF. 45 and TF. 46 reading 265±105 B C. and 260±100 B.C. were derived from the end phase of the pre-defence deposit and consequently they will date the end of the Early Phase of NBP as well as the beginning of the Late Phase of NBP. On the basis of these dates we can place the end of the Early Phase of NBP and the beginning of the Late Phase of NBP at Rajgir to round about *circa* 300 B.C. Sample TF.446 reading 35±105 B.C. derived from the top level of the 'NBP deposit' at Chirand is a good example where the date proposed on archaeological ground for the end of the Late Phase of NBP (about the beginning of the Christian era) is in conformity with the date arrived by radiocarbon method. At Sohagaura, the initial and the terminal dates of the two phases of NBP cannot be calculated. However on the basis of three samples the existence of NBP from 600 B.C. to 240 B.C. is well attested. We have no date for the Early Phase of NBP at Prahladpur. But from one date of 765±500 (TF. 186), derived from the immediately preceding pre-NBP phase, the beginning of the Early Phase of NBP can provisionally be assigned to sixth century B.C. We have one date PRL-184 which reads 180±110 B.C. from the Late Phase of NBP (which *interalia* also denotes break in occupation) of Takiaper which falls within the chronological span proposed for the Late Phase of NBP. At Rajghat, on the basis of TF. 293 and TF. 292, the Early Phase of NBP can be dated somewhere around *circa* 500 B.C. For the Late Phase of NBP we have no dates. Sample TF. 176 reading 105±105 B.C. is consistent with the dating of the Late Phase of NBP. At Kausambi, the Mid Phase of NBP bracketed from 500 B.C. to 270 B.C. and the Early Phase extrapolated to *circa* 650 B.C., both combined, probably corresponds to our Early Phase of NBP. For the Late Phase of NBP we have TF. 100 which reads 275±100 B.C. On the basis of three thermoluminiscence dates of 819, 740 and 710 B.C., derived from the immediately preceding strata of the NBP deposit at Sringverapura, the beginning of the Early Phase of NBP at the site can very well be placed to *C.* 700 B.C. On the basis of PRL-197 and PRL-198 (reading 530 and 620 B.C. respectively) from Bateshwar, the beginning of the Early Phase of NBP at the site should be somewhere between 620 to 530 B.C. Khalaua also supports such a view. On the basis of PRL-334, the Early Phase of NBP at Mathura starts about 700 B.C. For the Late Phase of NBP, PRL-338 giving the value of 400 B.C., is quite consistent with the archaeological date proposed for the start of this phase. At Atranjikhera, TF. 284, TF. 283 and TF. 195 (reading 295±100, 260±105 B.C. and A D. 50±100) are consistent and reasonably explain the chronological span of the Late Phase of NBP from *C.* 300 B.C. to A. D. 50. BM-194 and SWU, reading 540±150 and 530±150 B.C. puts the beginning of the Early Phase of NBP to *circa* 500 B.C. The available evidence at Ahichchhatra also indicate the beginning of the Early Phase of NBP at the site to *C.*500 B.C. and the Late Phase of NBP persisting up to about 150 B.C. At Hastinapura the date of 340± 110 B.C. (TF.88) from the lowest layer of Period III (which marks the beginning of NBP at the site) is valid in context of other three radiocarbon dates, reading 335±110 (TF. 83), 375±100 (TF.112) and 385±110 (TF.90), derived from the end phase of the PGW deposit at the site. This is consistent with the date of 400-300 B.C. proposed for the beginning of the Late Phase of NBP. As to its end the date of 50±110 B.C. (TF.80 and 82) seems to be more reliable as it represents a composite of two samples derived from identical layers and depths marking the end of NBP at the site. Thus the beginning and end of the NBP at Hastinapura on the basis of ^{14}C dates can be placed from 340 B.C. to 50 B.C. which is almost in agreement with the time-spread of 400-300 B.C. to the beginning of the Christian era as proposed by us. Sample PRL-83 reading 275 B.C. derived from Allahapur Sub-period IB helps in dating the Late Phase of NBP.

The Early Phase of NBP or the beginning of NBP at Noh and Kayatha may be placed to sixth and fifth centuries B.C. respectively. Ropar, Besnagar and Ujjain, however, date the arrival of NBP in between 500 to 400 B.C. and hence creates difficulty in demarcating the two phases of NBP. PRL-158 reading a date of 20 A.D. at Amaravati may be valid as the Late Phase of NBP might have continued up to 20 A.D. at this outlying site. The two dates from Charsada reading 270±60 (UW-77) and 50±70 B.C. (UW-70) are consistent with the date of the Late Phase of NBP arrived on archaeological grounds.

Combining the stratigraphical as well as radiocarbon date in respect of sites which yielded NBP, we find that the initial date for the NBP would range from 7th-6th centuries B.C. Consequently it will also date the beginning of the Early Phase of NBP. As to the end of this phase and the beginning of the Late Phase of NBP, a date of fourth-third centuries B.C. may be assigned. Barring a few sites (e.g. at Sringverapura NBP ceased to occur after 200 B.C.) the Late Phase of NBP (in which NBP may or may not be present) continued up to about 100 B.C. or to the beginning of the Christian era.

4

Material Culture of the PGW, Early NBP and Late NBP Periods-I

In the last chapter we have grouped the PGW and the Early Phase of NBP of the Ganga Plains under Early Phase of Iron Age. Culturally PGW sites are found in the Upper Ganga Plain and the early NBP sites are widely distributed in the Middle Ganga Plain (*i.e.* eastern U.P. and Bihar). There is a good degree of correspondence in time as stratigraphically these two deposits immediately precedes the Late Phase of NBP or the Late Phase of Iron Age. So this puts the PGW phase of the plains on a different footing than its counter part in the Ghaggar (Sarasvati), Drisadvati (Chautang) and Sutlej basins. In the classification of the sites into Early and Late Phases of the Iron Age much emphasis was laid on the provenance or the non-provenance of the PGW or NBP, emergence of Iron and structures of baked bricks. Such a study may not be wholly complete. PGW and NBP are prized commodity, and their provenance in a particular strata may be due to several reasons. Then PGW and NBP themselves alone do not constitute a culture. They are certainly one of the dominant attribute of the Iron Age culture (*Supra*). The study simply based on the quantity and frequency of iron tools may also alter the true assessment of the herald of the Iron Age. The emergence of baked brick structures in a particular strata is also only an abstract criteria to distinguish a city from a village. It will be, therefore, worthwhile to study all the material remains in detail in order to have a correct grouping of these deposits into the various phases of the Iron Age. Besides this, the study will also reveal the following :

1. By examining the cultural traits of the PGW phase and the Early Phase of NBP, we shall be able to establish the points of inter-relationship between the two.

2. The study of the material remains of the Early Phase in conjunction with the Late Phase of the Iron Age of the Ganga Plains will bring out the differences and similarities between the two in clear perspective and its role in ushering the second urbanization in India if any ?

1—Settlement Pattern :

The beginning of the colonization of the Ganga Plains starts with the black-and-red and black slipped wares belonging to the chalcolithic period. On this basic substratum, almost at the same time plane, the PGW with iron appeared on the scene in the Upper Ganga Plain and NBP with iron in the Middle Ganga Plain. Hence it is wrong to suggest that occupation of the plains could not have been possible without iron. However, the introduction of iron is expected to have brought changes in the all round promotion of the civic life in both PGW and NBP cultures. Particularly, iron implements must have been thought imperative to meet the requirement of the increased population by cutting down of the dense forests of the plains.

The material equipment of the people who produced PGW and NBP in the Early Iron Age is definitely richer than the preceding black-and-red ware deposit. But in the absence horizontal excavations the pattern of habitations at the PGW and NBP sites is not known. However, a settlement study of the PGW sites carried out by Makhan Lal in the District of Kanpur in Uttar Pradesh may be significant[1]. He notes : "The number of PGW sites located in Kanpur District is 40. All except 5 are located on the river banks. Other five are located along low lying areas where water accumulates during rainy season. The habitation deposit at these sites is less in thickness than that of river bank sites and therefore the duration of occupation at these sites was shorter. The sites which are on river banks are on elevated land......... . The sites on the bank of the Ganga are much bigger in size (4-8 acres) and more closely spaced than those on tributaries".

The evidence indicates that in the beginning the habitation was sporadic and was not uniform. Later on the PGW people preferred to reside on river bank and the maximum spread of their habitation was seen on the bank of Ganga. Possibly, the plains with pastures provided them with an opportunity for a considerable increase in their settlements. This is corroborated by the PGW settlement exposed at Jakhera, a site situated on the left bank of the Kalinadi. It has been noted here that 'the settlement area was extended to its present extent of the mound during this sub-period, there by indicating a perceptible growth in the population'[2]. It may be also noted in this connection that while the earlier settlement of the black-and-red ware continued to remain occupied by the PGW society may new sites like Allahapur, Kampil, Khalaua, Bateshwar and Mathura (at all these excavated sites the habitation starts with the PGW) sprang up. This certainly indicate colonization of the plains

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1. Makhan Lal, 'Study of PGW culture in Area Perspective' a paper read at the Seminar on Indian Prehistory, held at Allahabad University, Allahabad in December, 1980. Despite my best efforts, I could not acquire a copy of the paper, 'Settlement History of the Ganga-Yamuna Doab from 1500 B.C. to 150 A.D.,' a paper read by Makhan Lal at the Joint Sessions of the Indian Archaeological Society and the Indian Society for Prehistoric and Quaternary Studies held at Waltair from 29th-31st December, 1981.
2. M.D.N. Sahi, 'New Light on the Life of the PGW people as revealed from Excavations at Jakhera,' *Man and Environment*, volume II, (Ahmedabad, 1978), p. 102.

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on a much more wider lines than the preceding phase of the black-and-red ware. Thus the number of PGW sites is not only large but their thickness varying from 50 cm to 3.45 m is also much more than the cultural deposit of the black-and-red ware which usually varies from 20 to 50 cm. This shows that the duration of the PGW settlements was much longer.

For the settlement during the Early Phase of NBP, we have meagre evidence at Rajghat and Prahladpur where the habitation was confined to only certain parts of the mound. This shows that in the beginning of the Iron Age the size of settlements were moderate and sporadic.

The evidence at Atranjkhera is more significant as regards the relative areas inhabited by the PGW and Early NBP Phases are concerned. Here, 'the PGW settlement is confined to the eastern side of the mound towards the river Kali. The earliest cultural deposit on the rest of the mound, with a few exceptions, belongs to the NBP Ware phase, which lies immediately over the natural soil. So far about 650 square meters of the PGW occupation have been exposed, and it is presumed that the total area of the settlement of the Ware would be more than its double. Of course, much of the occupation has been washed away by the annual floods. Although the exact area of the NBP has not yet been determined, it would be approximately 850×550 meters'[1].

For the Late Phase of NBP or the Late Phase of Iron Age we have no idea of the extent of the occupation as the vertical excavations have not laid bare this deposit in its entirety. However since a considerable portion of the country was on the threshold of urbanization during this period, one should expect an extension of the physical size of the inhabited area along with the richness in the material remains.

2—BUILDING REMAINS (Plates 1, 2 and 3) :

It would be seen from Table 1 that baked bricks co-occurs[2] with PGW from as many as seven sites. While it is not clear from the published notes of Hastinapura and Ahichchhatra if these bricks come from early or late levels of the PGW deposit, all that can be said is that baked brick was known to the PGW people of these sites. At Jakhera, however, it is clearly mentioned that baked bricks were used for special ritualistic purpose in the mature phase of the PGW. The data in respect of Bhagwanpura, Dadheri, Kasital and Sanghol clearly indicate that baked bricks were used for building purposes in the last phase of the PGW culture.

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[1] Quoted from A. Ghosh, *The City in Early Historical India*, (Simla, 1982), p. 60.

[2] According to B.B. Lal, "If we look round all over India, we cannot find a single site other than Allahapur where the PGW co-occurs with burnt-brick structures and any kind of writing much less a late Mauryan seal. Burnt-brick structures and seals in Mauryan characters have been found to occur usually in middle NBPW phase by which time the PGW had completely disappeared, for example in Period III of Ropar." See B.B. Lal, 'Did the PGW continue up to the Mauryan Times' *Puratattva*, no. 9, 1977-78, (New Delhi, 1980), p. 72.

TABLE 1

Size of Baked bricks in the PGW and NBPW Periods

1	2	3	4	5	6
S. No.	*Site*	*Size*	*Purpose*	*Period*	*Published References*
1.	Bhagwanpura, Distt. Kurushetra, Haryana	1. 20×12×8 cm 2. 12×12×8 cm 3. 29×22×12½ cm (wedge-shaped) 4. 20×30×8 cm 5. 16×12×4 cm	For house construction (some of the bricks had deep finger marks)	From the third structural phase of the PGW culture (Sub-period IB) which was interlocked with the Late Harappan	*Man and Environment* Vol. II, (1978), p. 90.
2.	Dadheri Distt. Ludhiana, Punjab	1. 12×12×7 cm 2. 25×20×5 cm	Wall of baked bricks	Last phase of the PGW culture (Sub-period IB) which was interlocked with the Late Harappan	*Man and Environment*, Vol. II, (1978) p. 100.
3.	Kasital, Distt. Kurushetra, Haryana	Circular Barn of 2.05 m. diameter	Barn	Period 1 with PGW, black-and-red ware and some shapes in red ware reminiscent of Ach. 10 A and rimless *handi.*	*I.A.*, 1975-76, p. 17.

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Table I. Contd.

1	2	3	4	5	6
4.	Sanghol, Distt. Ludhiana, Punjab	A baked brick of 26×22×10 cm size was found	Not mentioned	Period IC—Overlap Phase between the Late Harappan and the PGW culture	*I.A.*, 1977-78, p. 43.
5.	Jakhera, Distt. Etah, U.P.	Baked bricks known, size not available	Used for special ritualistic purpose	Period IIB—Mature Phase of PGW culture	*Man and Environment*, Vol. II, (1978), p. 102.
6	Hastinapura, Distt. Meerut, U. P.	A fragmentary brick	Not known	In one of the pits of Period II—PGW culture	*A.I*, Nos. 10 and 11, p. 13.
7.	Ahichchhatra, Distt. Bareilly, U.P.	A broken brick of 22×6.25 cm	Not known	Period II—PGW culture	*I.A.*, 1963-64, p. 43.

Table I. Contd.

1	2	3	4	5	6
8.	Allahapur, Distt. Meerut, U.P.	1. 33×16×55 cm 2. 39×19.5×5 cm Bear finger designs possibly as frog-marks.	Most of these were found in debris hence purpose could not be ascertained	Sub-period IB—PGW with Late NBP assemblage	*I.A.*, 1970-71, p. 41.
9.	Alamgirpur, Distt. Meerut, U.P.	1. 31.8×31.8×9.5 cm 2. 47.7×31.8×9.5 cm All bore three-finger frog-marks	Not known	Period III—Late Phase of NBP	*I.A.*, 1958-59, p. 54.
10.	Mathura, U.P.	64×42×7/9 cm	Facing of a Platform	Period II—Late Phase of NBP	*I.A.*, 1975-76, p. 55.
11.	Sonkh, Distt. Mathura, U.P.,	1. 40×25×5 cm 2. 42×26×6 cm	Building Purpose	In Pre-Kushan levels. The baked bricks starts appearing from *circa* 100 B.C. onwards	*I.A.*, 1970-71, p. 40.

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Table I. Contd.

1	2	3	4	5	6
12.	Rajghat (Varanasi) U.P.	1. 50×31×5 cm 2. 48×28×5 cm	For house construction	Period II—Late Phase of NBP	*Excavations at Rajghat*, Part I, 1976, pp. 26-27.
13.	Hulaskhera, Distt. Lucknow, U.P.	43×24×7 cm	Not known	Period II—Early Phase—Late Phase of NBP	*I A.*, 1978-79, p. 74.
14.	Manwan, Distt. Sitapur, U.P.	40×25×6 cm	Not known	Pre-Sunga levels—Late Phase of NBP	*I.A.*, 1969-70, p. 44.
15.	Jajmau, Distt. Kanpur, U.P.	48×24×7 cm	In a wall	Period I, called Mauryan—Late Phase of NBP	*I.A.*, 1975-76, p. 52.

Table I. Contd.

1	2	3	4	5	6
16.	Batesvara, Distt. Agra, U.P.	50×25×8 cm	Two Walls of twelve courses laid in headers	Period II—Late Phase of NBP	*I.A.*, 1975-76, p. 43.
17.	Chirand, Distt. Saran, Bihar	46×25×8 cm	In some remains of structure	Upper levels of Period II—Late Phase of NBP	*I.A.*, 1964-65, p. 6.
18.	Sonepur, Distt. Gaya, Bihar	53.3×29.2×7.5 cm	Not known	Period V—Late Phase of NBP	*I.A.*, 1956-57, p. 20.
19.	Balirajgarh, Distt. Madhubani, Bihar	50×20×4 cm	In the earliest phase of the rampart	Late Phase of NBP—2nd century B.C.	*I.A.*, 1972-73, p. 7.
20.	Katragarh, Distt. Muzaffarpur, Bihar	1. 40×24×8 cm 2. 50×30×8 cm	In the first phase of the fortification. In the third phase of the fortification	Period II—Sunga Period—Late Phase of NBP	*I.A.*, 1975-76, p. 8. *I.A.*, 1976-77, p. 12.

Table I. Contd.

1	2	3	4	5	6
21.	Champa, Distt. Bhagalpur, Bihar	40×25×7 cm	Wall found on the extant top of the rampart	Ascribed to *circa* first century B.C.—Late Phase of NBP	*I.A.*, 1971-72, p. 5.
22.	Jaderua, Distt. Gwalior, M.P.	45×22.5×7.5 cm	In a 16 m long wall	Period IIA dt. *circa* mid-fourth to 2nd cent. B.C.—Late Phase of NBP.	*I.A.*197-72, p. 29.
23.	Pauni	55×37×7 cm	In a *stupa*	Phase I—Late Phase of NBP	*I.A.*, 1971-72, pp. 20-21.
24.	Amaravati, Distt. Guntur, A.P.	1. 47×30×9 cm 2. 42×21×9 cm	Gateway of *stupa*	Period II. dt. 2nd century—1st cent. B.C.—Late Phase of NBP	*I.A.*, 1973-74, p. 4.
25.	Ghuram, Distt. Patiala, Punjab	31×20×cm	Oblong structure	Sud-period IC dated from 3rd cent. B.C. to 2nd cent. B.C.—Late Phase of NBP	*I.A.*, 1976-77, p. 4.

Table I. Continued.

1	2	3	4	5	6
26.	Ranihat near Srinagar in Tehri Garhwal	1. 30×23×7.5 cm 2. 22.8×21.5×5 cm 3. 23×17.5 cm—wedge shaped	For houses	Period II A dated 400-200 B.C.—Late Phase of NBP	Information kindly supplied by K.P. Nautiyal.
27.	Moradhwaj, Garhwal	1. 42×20×8 cm 2. 46×20×8 cm	For houses	Period I dated 4th cent. to 2nd cent. B.C.—Late Phase of NBP	*Journal of Himalayan Studies and Regional Development*, Vol. 3, (1979), p. 78.

In the Late Phase of NBP its use became more extensive (Plates 1, 2 and 3). The discovery of a baked brick wall 3.6 m. wide and exposed to a length of 75 m at Ropar, turned out to be the retaining wall of a large tank fed by rain-water through a brick built inlet. Brick linned channel (11.01 m wide at the top and 3.96 m wide at the base), a 13.75 m deep well constructed of wedge-shaped bricks in one hundred and sixty five courses and a massive underground reservoir with a low parapet-wall, all the three at Ujjain (Plate 1, C and D) and a barn at Hastinapura (Plate 3 A) and Nevasa, testifies to the fact. A brick-built stepped tank exposed in one trench at Tamluk (Plate 1, A) and a wall of burnt-brick found to run for nearly 8 m at Hastinapura also reveals the same picture. During this period baked bricks were also used in strengthening the ramparts with revetments and in the construction of *stupas*. An apsidal structure of dressed stone is also noticed at Ujjain (Plate 3, D).

The available data (Table 1) in respect of the periods shows that the sizes of bricks varied according to the purpose of the structures in which they were used. There was no standard size in any of the above periods. Thus the bricks of the PGW phase has smaller length and breadth whereas the structures of Late Phase of NBP have comparatively larger size bricks. Its extensive use in the Late Phase of NBP can very well be regarded as the index of major building activities. In the PGW phase, the evidence of post holes at Atranjikhera and Allahapur points that generally the houses were made by using wooden or bamboo screens and then they were plastered with mud, as is evidenced by the remains of lumps of clay, bearing reed or bamboo impressions from sites like Alamgirpur, Hastinapura, Atranjikhera and Allahapur. Husk of rice was used to reinforce the mud or mud walls with plaster as observed at Hastinapura. Floors were made of rammed mud earth, sometimes mixed with baked mud clods. At Atranjikhera[1] five floor levels were identified. Khalaua[2] yielded a mud brick platform or flooring. At Allahapur mud floors with post holes were noticed. To the Early Phase of NBP at Rajghat, Structure 212, was a 5.5 m thick floor of burnt clay with two post-holes. Above this there was a clear indication of a wall of mud with regular mud layers.[3] How the houses were roofed either in the PGW phase or in the Early Phase of NBP, cannot be said precisely. But as rains were expected to be heavy in the Ganga Plains, it can be inferred that mud could not be relied upon for this purpose. The roof may have had a wattle-cum thatch base in all these two deposits.

There was a good stride in the architectural field during the Late Phase of NBP or the Late Phase of Iron Age. As the evidence suggests, the use of mud and-mud-brick for making house was being supplemented by the kiln-burnt brick. The best evidence regarding the use of baked bricks for building purposes comes from Rajghat. Here two

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1. *Indian Archaeology*, 1963-64, *A Review*, (1967), p. 49.
2. *Indian Archaeology*, 1965-66, *A Review*, (1973) p. 42.
3. A.K. Narain and T.N. Roy, *Excavations at Rajghat*, 1957-58-1960-65 Part I, (Varanasi, 1976), p. 23.

room of baked bricks (size 2.56×2.57 m and 2.13×2.57 m) with two passages of 66 cm each for doors along with plinth and foundation were exposed (Plate 2). The baked brick which was already used in a limited way in the PGW was now being used increasingly. Its use, was not confined only to some specific purposes. As noted above, instead, they were used extensively in structures of public utility. Structures of mud and mud-brick still persisted as at Hastinapura, Mathura, Rajghat and Sonepur. At Hastinapura three mud-walls (Walls 2, 3 and 4) suggested the existence of two rooms, one of which measured at least 4.56×4.56 m. Floors were of different kinds. Hydraulic lime floors were seen at Sonepur[1]. An impressive burnt-brick floor was noticed at Atranjikhera[2] (Plate 3, B).

ROADS

The evidence of a partially exposed road of about 4.25 m in width flanked by mud floors on either sides belonging to the PGW phase comes only from Jakhera. The evidence of a *kaccha* street from the Early Phase of NBP comes from Rajghat.[3] It was built over the occupational debris after giving a soling of earth of about 10 2 cm in thickness, containing pot-sherds, gravel and mud clods, all thoroughly rammed. This was again covered by another soling of packed earth of about 10.2 cm in thickness. Its total thickness in section was 33.1 cm. Its dimension, however, could not be ascertained as it was not possible to extend the trench in any direction.

In the Late Phase of NBP we have a road at Kausambi[4] which originated in *circa* 350 B.C. and continued to be in use till A.D. 300. Similarly, a concreted road at Ahichchhatra which originated in *circa* 200 B.C. also continued for several years.

3—FURNACES AND OVENS (Plate 4) :

Two open type furnaces provided with bellows for forging and smelting of iron object were found in the early phase of the PGW period at Jodhpura. In the PGW deposit at Atranjikhera[5], interesting structural remains were those of black smiths furnaces, a pottery-kiln and several clay hearths. The clay hearths were single-mouthed, semi oval in shapes and 30 to 25 cm in height. These were found at several floors levels. The black-smiths furnaces were circular fire-pits filled with ash, iron tools and clay cones. The pottery kiln was recognized only by numerous pots lying *in situ*. Closed and open mouthed hearths were reported from Allahapur and oval shaped from Kesari. In the Iron Age deposit, open circular hearth on a single mounted *chullah* are reported from Koldihwa.

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[1] *Ibid*, 1956-57, p. 20.

[2] *Ibid.*, 1962-63, p. 34.

[3] Narain and Roy, *op. cit*, (1976), p. 54.

[4] G.R. Sharma, Excavations at Kausambi, 1949-50, *Memoirs of the Archaeological Survey of India*, 74, (1969), pp. 59-61.

[5] *Indian Archaeology*, 1963-64, *A Review*, (1967), p. 49.

In the Late Phase of NBP, a blacksmith's furnance has been also reported at Mathura. Channel furnaces, which run parallel and across each other were found with burnt reddish earth mixed with charcoal at Vaisali[1]. No iron slag or any other object was found in or near them and hence their purpose could not be ascertained. Pottery ovens at Sonepur[2] and circular ovens at Vaisali[3] indicate kitchen equipment. At Sonepur[4] in one of the trenches was encountered a platform, over a part of which were a few complete pots, while on another part, there lay a saddle quern and four pestles of stone around a hearth. The whole picture fits well with that of a kitchen. A circular mud-walled room containing some hearths was reported from Allahapur. Multiple ovens on mud floors are known from Ahichchhatra[5] (Plate 4, B). A peculiar type of hearth with one mouth and three opening was exposed on a mud floor at Atranjikhera[6]. (Plate 4, E). A series of hearths are reported at Purana Qila (Plate 4, A). A blacksmith's furnace and long and deep channel furnaces for making bead are found at Ujjain (Plate 4, D and C.)

4–SANITARY DEVICES :

A convenient supply of clean water and the sanitary disposal of human wastes are essential, although not the only, ingredients of a healthy productive life. Water that is not safe for human consumption can spread disease, water that is not conveniently located results in the loss of productive time and inadequate facilities for excreta disposal reduce the potential benefits of a safe water supply by transmitting pathogens from infected to healthy persons. The most satisfactory method now a days, of excreta collection and disposal is the sanitary sewer but it is not possible nor necessary to instal such systems in our villages in ancient times nor it is generally feasible to instal septic tank with necessary plumbing etc. Pit latrines are just as effective as these modern methods in controlling faecal borne diseases and are cheap to build and easy to maintain. They cannot afford to be without such a latrine, since the cost of having one is far less than the loss of working hours, strength and loss of life from faecal borns diseases. In the Early Phase of NBP, while the drinking water might have been obtained from the nearby river or riverlet or stream (for about all the sites are situated on the bank of some or other river), individual houses had their own sanitary contrivances for the disposal of the sewage. Though the evidence from excavations is not adequate in the sense that we have no proper idea about the exact location, depth and other details of the privy or soak pits or pits in the houses or streets, because of small scale vertical digging, from our account of a few such pits in the earlier dwellings of Rajghat, we can form some idea.

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1. *Vaisali Excavations*, 1950, (Vaisali, 1961), p. 15.
2. *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 19.
3. *Vaisali Excavations*, 1950, (Vaisali, 1961), p. 8.
4. *Indian Archaeology*, 1960-61, A Review, (1961), p. 5.
5. *Ibid.*, 1963-64, p. 44.
6. *Ibid.*, 1965-66, p. 47.

A. Pit Latrines :

Type A :

A pit latrine has two components—namely a unlined dugout circular pit and a squatting arrangement (or seat). In the Early Phase of NBP at Rajghat (dated from *circa* 600 to 400 B.C.) these pit latrine consists of a circular pit about 60-50 cm in diameter dugout to a depth of 7.14 m below the ground label. These were found to cut a portion of occupational debris up to the depth of 1.2 m and then natural soil to a depth of 5.94 m so as to extend below the water table. To avoid collapse of unlined pit wall, the outside of the pits were found filled with rough *kankary* soil. They lie in close proximity and the distance between the two was not usually more than 76 cm. Three such pit latrines (Pit Numbers 14, 15 and 16) were located at Rajghat.[1] Thus these pits are constructed sufficiently deep so that the excreta may directly fall quite below in the sub-soil water. The second part or a squatting plate or a seat might consist of two timber planks (which has now perished and hence their remains are not to be found), placed closely spaced over the pits so that their arms may extend well beyond the pits. These pits were found filled with loose brownish earth and a coating of greenish moss on the sides along with NBP and associated wares. The find of some complete vases of dull red ware resembling a *lota,* inside these pit is not without significance. These pots were devoid of any slip or wash and their fabric was so rough that they could not have been used twice. Hence it is not unlikely that these vases were used as *lotas* for carrying water for flushing and leansing by persons accustomed to use these pits as latrines.[2]

Type B :

These second types of pits (Pit Numbers 1, 2, 3 at Rajghat-II and Pit Numbers 8, 9, 10, 11, 12 and 13 at Rajghat-V) were also located at Rajghat[3] and were also used as pit latrines by people belonging to the Early Phase of NBP. In their simplest form, these pit latrines has again two components—namely a unlined pit and a squatting arrangement (made of perishable material). But they differ from the above pits in the following respects.

(a) The diameter of these pits was larger (normally varies from 73 cm to 1.03 m).

(b) To eliminate the need to construct very deep pits, these were cut into the natural soil only up to the maximum depth of 4.36 m. Thus these are constructed so as not to

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1. A. K. Narain and T. N. Roy, *Excavations at Rajghat,* Part I, The Cutting, Stratification and Structures, (Varanasi, 1976), pp. 59-61.
2. The use of such pits as latrines has been observed by us in certain parts of U.P. even today. These are popularly called as dug-outs.
3. Narain and T.N. Roy, *op. cit.*, (1976), pp. 39-40 and 53.

extend below the water table so the pit remains dry and ground water contamination is minimized.

(c) They lie close to each other and are always outside the limit of the main habitation. When two pits are available, one pit would be used until full and then sealed while the second pit is in use. When the latter is almost full, the first pit would be emptied and put back into use once more. By alternating, the two pits can be used indefinitely. Because of the long residence time of the decomping excreta in the pit not in use at the time, pathogenic organism will have been destroyed by the time the pit needs to be emptied. As a oonsequence, there is no danger of spreading pathogens and the excavated humus like material can be used as a soil conditioner or disposed of without fear of contamination. These types of pits (Types A and B) without any lining represent the initial stage in the evolution of so called ring wells (the components of such wells is a dug out pit always encased with terracotta rings) which we start getting (*Infra*) a little later (about *circa* fourth century B.C.) within the same NBP Period, called for the sake of convenience as the Late Phase of NBP.

B. Refuse Pits

In the PGW occupation at Jakhera, we have a evidence of a circular unlined pit. This pit was located on one side of a road outside the limit of a house and according to excavator it was used as refuse pit.[1] Also at Koldihwa, in the corresponding strata of comparable age, *i.e.* in the Early Phase of Iron Age (which succeed the chalcolithic), circular pits of varying dimension (1. 6 to 4.00 m) were found for the disposal of waste material of every day use.[2]

Almost identical pits were also reported during the Early Phase of NBP at Kausambi,[3] Sravasti, Rajgir, Bhir mound, Taxila but it is doubtful whether they were used as pits latrines or as refuse pits or were meant for some other purpose.

C. Ring Wells (Plates 5 and 6) :

In the Late Phase of NBP, the high sence of sanitation exhibited by the people was remarkable. Since urban and concentrated rural settlements consider sanitaion more of a problem than do dispersed communities, initial efforts to introduce better sanitation technologies are likely to be more effective in urban than rural areas. Pit latrines, however, as described above, have been found to provide satisfactory service in the Early Phase of NBP when the population was not so dense and with sufficient open space all round the need for private arrangements did not arise. In the Late Phase of NBP *i.e.* in a densely populated urban areas they became infeasible. Hence one of the most important technical contributions in the field of sanitary engineering of this period was the introduction of the so called ring wells. These ring wells have to be distinguished from the early two types of pit-latrines (Types A and B) because of being always lined with circular terracotta rings. One of the most important technical advances of this period is the design of these rings or *Cudas* which were placed inside the pits for stopping the contamination and collapse of the sides Thus this step-by-step improvement leading from Type A to Type B and than switching on to ring wells is a example of sanitation sequences and show that in the Late Phase of NBP, the socio-economic status of the people improved. Secondly as we shall see below these ring wells were not only used as pit latrines but were also put to variety of usages. Thirdly the more important point is that these ring wells, so characteristic feature of this culture had a wide spread distribution both in time and space and are still a living tradition in India. Perhaps this evidence is of added significant when we find that it is this culture which along with other elements of its urbanization left some of its imprint on future Indian Civilization.

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[1] M.D.N. Sahi, 'New Light on the Life of the PGW people as revealed from Excavations at Jakhera, Distt. Etah', *Man and Environment*, volume II, (Ahmedabad, 1978), p. 103.

[2] *Indian Archaeology*, 1975-76, *A Review*, (1979), p. 45.

[3] *Indian Archaeology*, 1955-56, *A Review*, (1956), p. 20.

In this, Late Phase of NBPW Period, we get two types of ring wells. In the first category, are those ring wells, the well of which were lined with earthen ware rings to certain depth, below which the pit narrowed and left unlined. In the second, are those, which have terracotta or earthen ware rings placed throughout their depth. The method or their construction has been dealt by R.N. Mehta in 1963. Their distribution, location, characteristic of rings used, structural details and functions etc. have been exhaustively outlined by B.M. Pande as early as 1966 and hence need not to be retraversed here.[1] However some confusion about their origin and function is still noticed. Hence we cannot avoid this aspect of the study which can better be resolved, at least to a certain extent, by some new evidences. On the other hand paucity of details have, however, made it difficult to arrive at any definite conclusion. Nonetheless, mainly on the basis of circumstantial evidence, some important fact emerge out of the present study, which may help us in determining their origin and proper usages.

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[1] For the method of construction of Ring Wells see, R. N. Mehta, 'Ring Wells : Method of Construction, *Journal of the Maharajia Sayjirao University of Baroda*, vol. XVII, no. 1, (Baroda, April, 1968), pp. 137-140.

For their distribution, location and other structural details etc. see, B.M. Pande, 'Ring wells in Ancient India, *Bulletin of the Deccan College Research Institute, Silver Jubilee Volume*, (Poona, 1966), pp. 207-219.

1. Ring wells used as Latrines :

The second type of ring wells (*Supra*) with terracotta rings placed throughout their depth have been reported from a large number of sites. Their largest concentration is however seen in the Ganga Plains. They have the following characteristic :

1. Pits are excavated sufficiently deep into the natural soil or below the water table so that the excreta may fall sufficiently deep and may not be visible to the eye. The absence of odour, minimal fly and mosquito nuisance could be also avoided in such a construction.

2. These are encased with a set of earthen ware rings throughout their depth in order to prevent the collapse of sides and also contamination of the adjoining area.

3. The upper part of these ring wells are lined with a few courses of wedge-shaped bricks so that it may properly support the wooden squatting planks in which the person opting for an inside toilet sits. In some cases it was seen that this linning also continued slightly below the ground level. This might have been done in unstable soil condition. The wedge-shaped lining in some cases is also been above the then ground level which must have been done to prevent surface water from entering the pit.

To cite instances under the above category (where the ring wells were used as latrines) the best evidence comes from Hastinapura[1], where a ring well (labelled as Ring Well 4) was lined by a superstructure of five courses of wedge-shaped bricks. Its twenty four courses of rings were exposed without reaching the bottom which shows that it was excavated sufficiently deep. Similarly from the perusal of Plate XXIV (Plan of Hastinapura I) of the excavation Report of Hastinapura, another ring well (labelled as Ring Well 2) also shows the remnants of a similar superstructure of wedge-shaped bricks. This ring well was also excavated up to the depth of 7 m exposing 47 ring without reaching the bottom (Plate 5, E). Section looking south of Hastinapura I, in the Report shows that a considerable portion of this ring well was cut into the natural sand which suggest that the water table was not too far deep. From Plate VI-A of the excavation Report of Rajghat, a ring well shows a superstructure of wedge-shaped bricks. This ring well lies close to a brick lined Drain C, and belongs to *circa* 200 B.C.[2] One of the ring wells at Bhita also had a similar superstructure constructed of wedge-shaped bricks and the pit was also more than 6 m in depth.[3] The practice of constructing such superstructure also continued in the Pala Period as is evident from a example of a ring well at Bangarh.[1] At Brahmanabad[2] and Nevasa[3], the ring wells were dug much below the natural soil so as to extend below water table. These ring wells were designed to be used as latrines where the user was accustomed to the use of water for flushing and anal cleansing. Such an evidence is corroborated by the evidence at Nevasa and Rairh[4] where the ring wells were found coated with greenish moss due to constant contact with water flushed by the user accustomed for flushing and anal cleansing.

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[1] B. B. Lal, 'Excavations at Hastinapura and other Explorations in the Upper Ganga and Sutlej Basin', 1950-52, *Ancient India*, nos. 10 and 11, (New Delhi, 1954-55), pp. 25-26, Plates XXIII and XXIV.

[2] Narain and T. N. Roy, *op. cit.*, (1976), Plate VI-A.

[3] *ARASI*, 1911-1912, p. 33.

These ring wells, therefore, represent the final stage in the development of pit latrines in India. Despite the fact that these pit latrines in the initial stage of their evolution were used by the village communities in the Early Phase of the NBPW Period as early as seventh-sixth centuries B.C., the so called ring wells (pit latrines with terracotta lining) made their appearance only in the riparian urban settlements of the Late Phase of NBPW Period by about fourth century B.C. Its emergence and spread over a considerable part of India is conterminous with the Late Phase of NBPW Period. They are, therefore, one of the dominant attribute of the culture associated with this phase of NBPW Period. They continued to be in use in the subsequent periods and the tradition of their being used either as latrines or draw wells still continues in some parts of India. Now with the initial stage in the evolution of these ring wells found in the form of pit latrines (Types A and B) in the Early Phase of the same cultural deposit (NBPW Period) we may look to the possibility of their indigenous origin within our country itself. For it looks unnatural that the ring wells started appearing in a fully developed form in the Late Phase of NBPW Period without any know beginning. The main advantages of these ring wells being used as latrines are the following :

1. Unskilled labour is required for excavation of the pit and some skilled labour is required for lining the pit with terracotta rings, construction of superstructure of wedge-shaped bricks and making of wooden planks for squatting.

2. All the construction material is locally available and is cheap. Since the construction of ring wells is very simple it may be largely left to the householder. Civic responsibilities if any can thus be restricted to enforcing and assisting in the achievement of standard type of earthen ware rings (terracotta rings) if necessary.

3. Easy of maintenance and since the pits are deep they have a longer life than shallow pits.

4. The user have no fear of falling into it as it is throughout lined and cannot collapse. It is not possible to see the excreta as it is directly passed into the subsoil water.

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1. K. G. Goswami, *Excavations at Bangarh*, (Calcutta, 1948), p. 8.
2. *Annual Report of Archaeological Survey of India*, (1903-1904), p. 135.
3. H. D. Sankalia, S. B. Deo, Z. A. Ansari and Sophia Erhardt, *From History of Prehistory at Nevasa*, (1954-55), p. 58.
4. K. N. Puri, *Excavations at Rairh*, (Jaipur), p. 16.

5. Minimal water is required for flushing, cleaning of squatting planks and for anal cleansing.

6. Absence of odour nuisance and minimal fly and mosquito nuisance and hence minimal risk to health.

7. Suitable for those persons, if given the choice, opt for an inside toilet.

Their main disadvantages are that they are unsuitable for a very high density urban areas. They may pollute the ground water and they also require that separate arrangements be made for sullage disposal.

This clearly suggests that rings wells excavated to sufficient depth reaching much below the natural soil may not be always put in the category of wells for drawing water. Similarly also those rings wells which have a superstructure of wedge-shaped bricks may not always be used as draw wells. Normally we find that these ring wells are present in large numbers (often in clusters) within a considerable small area (Plates 5 and 6). It is difficult to imagine so many draw wells within a specified area particularly on sites which are situated right on the bank of a river. Ring wells are mostly located near a drain or a soakpit. There are instances also of twin ring wells in a large pit as at Tripuri and Nevasa (Plate 5,D). Also these ring wells which are constructed in the dry bed of a river or in sandy or rocky ground or when the water table is high may not be very deep. Then we have better devices for procuring water. Wells with lining of bricks had a wide spread distribution in space as well as time (dating back as early as the Harappa culture), and have been located on the same sites in which we have found these ring wells. Perhaps the need for these latrines particularly in a developing society constitute a greater health hazard. Many people, particularly the ladies, the old, the sick and the children, if given the choice, opt for an inside toilet than promiscuous defecation in the garden or alleys or nearby fields. Even today in certain parts of India particularly in Kutch-Bhuj region these ring wells are being used as latrines. However, we have definite evidences where these ring wells were also used as draw wells.

2—RING WELLS USED AS DRAW WELLS (Plate 7) :

In fact, those ring wells which were unearthed inside a kitchen or a room or a courtyard and reaching the sub-soil water (except in sandy or rocky ground or when the water table is high) and having a pavement or surmounted by well heads may generally be taken as wells for drawing water. At Sisupalgarh and Bhita the ring wells were capped by a stone with an aperture of the same diameter as that of the ring well. At the former site, rope-marks on the inner edge of the stone was also noticed which indicate that it was used as a draw well (Ptate 7, B). Similarly at Rajghat, Kumrahar, Bangarh, Nevasa, Nasik, Besnagar, Rairh, Mahasthengarh and Paharpur, a brick platform or stone pavement, serving an embankment for approach to the well have been noticed. The most interesting evidence was furnished by the excavations at Rajghat where a ring well was enclosed within a well laid brick pavement and located in between two house complex of the same period. This might have served as a draw well and its brick platform served the purpose of an embankment or provided an approach to the well[1] (Plate 7, A).

The evidence at Rajghat is corroborated by Bangarh and Nevasa. At Bangarh, a ring well belonging to Pala Period was surrounded by pavements with bricks-on-edge and laid flat bearing the sockets for placing the pitchers[2]. At Nevasa, by the side of a brick well, a storage jar was found fixed over the remains of a brick-platform. Similarly at Nasik the excavator thinks that the stones dumped close to a ring well might have served as an embankment or an approach to the wells. From the evidence of Bhir Mound, Besnagar, Brahmanabad in Sind and Ujjain, where ring wells were located inside a kitchen, we can say that they were used as draw wells. Such wells fitted with earthen rings are still in use in eastern India, Gujarat and parts of Uttar Pradesh.

3—RING WELLS USED AS SOAKPITS :

There are a few instances where ring wells have been used as soakpits. This is probably because we have other better as well as less economical means for disposal of sullage water. Drains in the vicinity of a ring well have been reported from Ujjain (Plate 8, D), Rajghat and Mathura (Plate 9, E) but whether these were connected to the ring well in any way is not known. Pottery drains quite close to the ring wells have also been found at Rairh but again we are not sure about their connection with the ring wells. The most unique evidence is from Avra[3] where a drain, 4.57 m long, made of terracotta pipes was found joined to the top of a ring well. This is the solitary but definite evidence of a ring well being used as a soakpit.

D—SOAK-PITS :

In the Early Phase of NBP at Rajghat, we have as evidence of a soak-pit passing close to a drain (*Infra*). In the Late Phase of NBP, we get another type of sanitary arrangement for the disposal of the dirty water. These are soak-pits with earthen ware soakage-jars with perforated bases. In this case several large storage vases were placed vertically one above the other in a pit dug for the purpose. The bottom of every jar was perforated. Thus they were set one above the other with holes knocked through their bottoms. While the people were careful enough to ensure the collection and removal of the solid waste from the jars,

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1. Narain and T.N. Roy, *op. cit.*, (1976), p. 69, Fig. 12 and Plate XIII.
2. K.G. Goswami, *op. cit.*, p. 8.
3. H.V. Trivedi, 'Excavations at Avra, *Journal of the Madhya Pradesh Itihasa Parishad*, no. IV, (Bhopal, 1962), p. 19, Fig. 1, Plate III.

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the hole in the bottom permitted liquid waste to be soaked into the ground. This must have been done regularly in order to prevent the choking of the jars and overflowing of sullage water into the adjoining area. This device was probably adopted by the dwellers as it occupied less space and also in order to avoid too many drains in a house or in the thoroughfare.

These have been reported from Hastinapura, Rajghat, Prakash (Plate 8, B), Vaisali and Tamluk. They usually have two or three jars and hence are shallow in depth. At Hastinapura, two such sets are found. In one case, three jars have been exposed (Plate 8, A) while in other only two. At Rajghat, one set with two jars was exposed. At Hastinapura and Rajghat, they occur close to the ring wells. These are the examples, where we get two different type of soak-pits at one place Plate 8, A). By far the most unique evidence is from Vaisali[1] where in one row three sets are seen. It is an example where these soak-pits occur in close proximity to each other (Plate 8, C). This may be due to fact that they were intended to be used alternately, one being left to dry, while the other was in use.

E—DRAINS (Plate 9) :

That the houses as well as streets and lanes were provided with surface drains, to carry off rain water, is also attested to from Rajghat where remains of a *kaccha* drain were exposed in the Early Phase of NBP. The drain was 2 m wide at the top and was exposed up to a length of 4.56 m. It had a gradual slope passing close to a soak-pit and was dug into the natural soil. It appears that the soak-pit was not able to receive the total output of the sullage water from the area and hence overflowed and its water silted and joined the drain. Later on both the drain and the soak-pit silted up and fell into disuse as is evidenced by two well-preserved human foot-impressions over the silted drain.[2] This was a unique evidence of its kind in the Early Phase of NBP. In the PGW level we have, so far, no evidence of any drain.

In the Late Phase of NBP every individual houses had a paved bath wherefrom dirty water could find an outlet into the mains through a private drain. Such drains were either of burnt brick or of pottery pipes. The first type of drains are to be found at Kausambi, Hastinapura, Mathura[3] Ujjain and Rajghat, while the latter one at Avra, Rairh, Ujjain and Chandraketugarh. The burnt brick drain was sunk out one metre from the ground level and was provided with a paved surface. The drain floor was skirted with bricks laid flat, the height of the skirting wall being unknown. To make the masonry water light, the surface of the drain was paved and sometimes polished.

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1. *Indian Archaeology*, 1958-59, *A Review*, (1959), p. 12.
2. Narain and Roy, *op. cit.*, (1976), p. 23 and 50.
3. *I. A.*, 1954-55, p. 16, Pl. XXVIII.

At Hastinapura[1], a drain was traced to a length of more than 7 m. It was sunk about a metre deep from the ground level and was provided with a brick floor and lining (Plate 9, A). At Kausambi[2] a drain was excavated to a length (Plate 9, C) of little less than 4 m. Baked brick drains of both rectangular (size : 41×22×6 and 50×25×7 cm) and wedge-shaped variety (size : 45×30 and 17×7 cm) are reported from Purana Qila[3] (Plate 9. B). The dimensions of these drains (Plate 9) suggest that they were responsible to drain out dirty water from a large part of a town. To ensure the smooth flow and to check the back flow of sullage water, necessary gradient was maintained. In order to check the solid waste from blocking the drain, another device was made. By far the most unique example of this device is from Rajghat. Here drain[4] C (dated to 3rd-2nd century B.C.) was brick lined and was traced up to about 2.75 m in length, after which it was found to be covered with large sized bricks. Thus it was partly open and partly covered. Its alignment was from north to south. Two bricks were found fixed vertically in the drain just before it was closed. The opening between the bricks and the inner surface of the drain was such as to prevent blockage of solid wastes like brickbats, stones etc. and to allow only the liquid waste to pass through. This bricks were the device of the same category as the modern iron sieves, which are put in the surface drains before they end in sewers or gullypits[5]. At Mathura[6], although the brick drain is not of such an dimension as at Hastinapura, Purana—Qila and Kausambi, it is found passing close to a ring well (Plate 9, E). A stone drain, 0.86 m deep and 0.45 m wide, built of dressed stone with flush point was found to a length of 4.64 m at Kausambi[7] (Plate 9, D). A similar drain of terracotta pipes (exposed only up to four long terracotta pipes) with a definite slope towards the east but not connected with any structure was exposed at Chandraketugarh[8] (Plate 8, E).

5—FORTIFICATIONS AND MOATS :

At Jakhera a low mud embankment with a basal width of 4.80 m and height of 1.20m and a moat/channel on the river side is believed to have been erected in the mature phase of the PGW. This would mean that Jakhera is remarkable in that at the PGW phase it had a fortification and a moat/channel which no other PGW site had. However since the height of the fortification is very low and it did not surround the entire settlement and the site is situated just on the bank of the river Kalinadi, its use probably was to defend the habitation from floods. The discovery of a moat/channel on the riverside at Jakhera is an unusual device. An mud embankment with an extant height of 1.70 m associated with

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1. *A. I.*, nos. 10 and 11, p. 16 and 25, Pl. XII, A.
2. *I. A.*, 1958-59, p. 47, Pl. LIV B.
3. *I. A.*, 1970-71, p. 8.
4. Narain and T. N. Roy, *op. cit.*, (1976), p. 26-27.
5. *Ibid.*, p. 44, Fig. 5.
6. *I. A.*, 1954-55, p. 16.
7. *I. A.*, 1961-62, p. 51.
8. *I. A.*, 1956-57, p. 30 and I. A., 1957-58, p. 1, Pl. LXXI.

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the PGW levels was also noticed at Kampil. Its details, purpose, and relation with the stratigraphy of the habitation area is not yet ascertained. However from its strategic position it appears to be a flood protection device. An mud embankment of the PGW phase with a basal width of about 7 m. (so far not reported) was noticed by M. D. N. Sahi at Atranjikhera. Since it was located on the eastern periphery of the mound on the riverside its use was also to protect the habitation against floods. Unfortunately the scanty available accounts of all these embankments fail to throw light on their details. In the Early Phase of NBP, Kausambi had an enormous fortification wall of 6.5 km. in circuit. According to excavator its first stage of construction begins in *circa* 1025 B.C. But according to A. Ghosh it is highly over dated and can be placed slightly earlier than the arrival of the NBP at the site. Regarding its use we should examine the topography of the site. On the western and eastern side of the ancient remains, the rivers Pali and Satira respectively form deep channels. The Yamuna here flows in the south-easterly direction. Its southern and northern banks are steep enough to take the on rush of water. During floods, water could spread here effortlessly and can cause damage to the neighbouring habitation. So the building of a mud-rampart in this area, at least in the initial stage of its construction, might have been done to resist the encroachment of flood water. In this connection, interim report on the excavations of 1962 is noteworthy. It says 'The rampart on the southern side was found to have been made of mud. This wall evidently served a dual purpose viz to defend the city in case of attack and save it from the floods of the Yamuna. The period of its construction and its subsequent history could not, however, be determined[1]. To the Early Phase of NBP, also belongs a clay embankment at Rajghat (the site of ancient Varanasi) built at a particular spot in order to prevent the flood water from entering inside the habitation area. The scouring of the habitation area, due to periodical flooding from the Ganga, must have been a constant source of nuisance to the earliest settlers at the site, the signs of which were to be seen in the form of an erosional line cutting the habitation area below the outer slope of the embankment. It was, therefore, natural that the inhabitants should erect a clay embankment as the first step in the planning of the settlement, corresponding roughly with the inner bend of the Ganga, particularly at a point where the river seems to have been attacking the habitation area. To give an idea of what M. S. Mate[2] thought about Rajghat fortification, we would quote a few lines from his article published in 1969-70.

'It further shows that scholars have somehow shunned from the idea of making a distinction between an embankment and a rampart, thereby confusing the history of military architecture The only noteworthy exception is that of Rajghat. The excavators of this site after detailed investigations arrived at the conclusion that the mud rampart they had found and had once considered to be defensive were in fact embankment meant to resist floods. And they have clearly said so[1].

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[1] *Indian Archaeology*, 1962-63, *A Review*, (1965), p. 33,

[2] M. S. Mate, 'Early Historic Fortification in the Ganga Valley', *Puratattva*, no. 3, (Varanasi, 1969-70), p. 8.

We have also a fortification at Pataliputra but nothing is known about the exact date of its construction. Pataliputra being situated on the confluence of the Son and Ganga, must have been susceptible to floods. The excavated ruins in the form of timber posts and wooden beems across them fixed with nails were probably the inner core of a huge earthen rampart. They might have served as reinforcements and thus the whole structure in the initial stage of its construction was built to defend the city from floods. It is most likely that on the top of this rampart timber parapets and wall of which Megasthenes speaks were erected. These parapets would shield the archers posted to defend the city. Thus it may have served both as embankment against flood and as rampart wall for defence purposes. M. S. Mate's[2] statement that 'Pataliputra could thus very well be treated as the first (known) step towards the transformation of flood embankments into military structures', may not be far from true. But it may not be the first site where such type of transformation took place. Regarding its date, the excavation of 1970-71, confirmed that the structure exposed formed part of the defences of the Mauryan Period. Hene it was built in the Late Phase of the NBP and the embankment, therefore, will naturally be assigned a date earlier than this.

All these sites except Pataliputra had also diversion channels or moat meant for protecting the habitation from floods.

In the Late Phase of NBP, we have fortifications at Kausambi, Pataliputra, Rajgir, Sravasti, Vaisali, Ayodhya, Champa, Balarajgarh, Katragarh, Mathura, Ahichchhatra, Chandraketugarh and Bangarh, all in the Ganga Plains. In contrast to the embankments of the PGW and Early Phase of NBP, these were meant exclusively for defence against enemies. It seem fairly clear that in the beginning Kausambi had embankment meant to resist flood and it was in the Late Phase of NBP that it was converted for defence purposes with certain modifications. It was in this phase that its height was raised and a burnt brick revetment, guard rooms, bastions and a stone paved corbelled drain were added-all sprung up probably to mark out urban settlements. Regarding Pataliputra the recent evidence comes from the small scale salvage excavation of the Archaeological Survey of India and the Government of Bihar conducted at Kankargarh (a locality within the city of Patna) in 1970-71. This excavation has exposed as many as fourteen wooden posts, arranged in four rows and placed 1.60 to 1.75 m apart. These were enclosed by wooden planks fixed with iron nails and thus according to excavators formed the core of the defence wall. Regarding its date, the excavations confirmed that the structure exposed belong to the Mauryan Period.

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[1] M.S. Mate, 'Early Historic Fortification in the Ganga Valley', *Puratattva*, no. 3, (Varanasi, 1969-70), p. 8.

[2] M.S. Mate, *op. cit.*, pp. 67-68.

RAJGIR AND NEW RAJGIR.

The town of old Rajgir is situated in a long valley surrounded on all sides by hills. The natural defences provided by the engirdling hills were first reinforced by raising a high rubble-wall, generally 4 m in thickness, over the hills, about 40 km in circuit. The natural gaps between the hills were used as gates. A smaller citadel inside it, pentagonal in shape and with a perimeter of 8 km, was later encircled by an earthen wall with rubble-core. Its date is not certain. In new Rajgir the habitation area was protected by an earthen wall. Here over the deposits of NBP (Period I) was built a mud-rampart in Sub-period II A. Associated with this phase of the rampart was also a moat, the exact dimension of which was not ascertained. The basal width of the rampart was 40.33 m and extant height 7.31 m. On the southern side, a brick built retaining wall 2.13 m height and 1.21 m wide at the top with a batter were the other features of this sub-period. In Sub-period IIB, a brick wall was added on the top. After the collapse of this brick wall, over the debris, a 2.13 m thick deposit of earth and ash was laid in Sub-period III A and thus the height of the rampart was increased. Above this layer a wall of brick-bats was constructed during Sub-period III B. Although the excavations at new Rajagriha, do not give any precise dates for the periods as well as rampart but it is clear that the rampart was built in Sub-period II A over the deposits of Period I. Since Periods I and II corresponds respectively with the Early and Late Phases of NBP, hence the beginning of the rampart can be assigned to the Late Phase of NBP *i.e.* to *circa* 400-300 B.C. As to its use, Rajgir did not face the problem of floods. The rivers flowing nearest to the ancient remains are at a very safe distance and even during the flood season, their waters would not have reached the site. Hence there is no need of any flood protection measure in this case. The fortification, therefore, was a device of military strategy *i.e.* against enemies.

SRAVASTI :

Some time during the first quarter of Period II (dated from *C.* 275 B.C. to 50 B.C.), the town of Sravasti was girdled with a mud-rampart of about 5 km in circuit. It had five structural phases. In the earliest phase, the clay rampart had a basal width of 29 m and extant height of 25 m. Phase 2 of the defences, however, does not represent any constructional activity. There are indications that the defences during this period were not used. In Phase 3, it was topped by brick fortification walls at regular intervals. In Phase 4, the height of the mud rampart was further raised with the mud-filling. In Phase 5 a wide brick-wall was rebuilt possibly with a slight change in the orientation. All this activity is assigned to the period from 250 B.C. to 50 B.C. *i.e.* to Sunga and Kushan times. The excavator finds that the details of the construction as seen in the rampart of Sravasti very much tallies with the description of fort given in Kautilya's *Arthasastra.*

Sravasti is on the southern bank of a sheet of water called Naukhan Jhil. Rapti today flows about more than 2 km north of the mound, but Cunningham thinks that Naukhan Jhil represents the old bed of river Rapti, also called as *Achiravati.* If however, the Rapti had already started changing its course by about 250 B.C., the rampart might not have been constructed to avert floods. Thus as said by the excavator, the defences might have been built as a measure against the possible threat of Indo-Greek invasion. A. Ghosh, however, thinks this suggestion has been given without much reason.

VAISALI :

The defences excavated at Vaisali showed three structural phases. The original rampart-wall of burnt brick about 6 m in thickness was built in Period II dated from 150 B.C. to A.D. 100. During the rule of Kushana (Period III), it was heightened with earth and encircled by a moat. In Period IV (Gupta Period), a brick wall 2.70 m in width was built on top of this earthen rampart. The barracks and other structures were also added. Thus the earliest rampart of bricks at Vaisali was built in the second century B.C. Here ascertaining the purpose of the construction does not pose any problem as the site is at a safe distance from water and hence the question of constructing any rampart as a device against flood protection does not arise.

AYODHYA :

In the excavations conducted at the site by B.B. Lal and Sundara Rajan from 1975-76 to 1976-77, a fortification wall of baked bricks and a deep ditch was reported. They belong to the Late Phase of NBP. Other details are not available.

CHAMPA :

Belonging to the Late Phase of NBP, we have a mud rampart with a basal width of 15 m and vertical extant height of 4.85 m at Champa (*I.A.*, 1969-70, p. 2; *I.A.*, 1970-71, p. 5 and *I.A.*, 1971-72, p. 5). It was built in two phases. In the earlier phase it was of blackish soil capped by a rubble spread. In the late phase it was built of yellow and red soil with an embankment of brick debris.

To this phase also belongs a fortification at Baliragarh which in its earlier stage was built of large sized baked bricks (*I.A.*, 1962-63, pp. 3-5 and *I.A.*, 1972-73, p. 7).

KATRAGARH :

The fortification at this site show three phases. In the earlier phase it was built of rammed earth and in the last phase of baked bricks. Watch towers were also built in this phase (*I.A.*, 1975-76, p. 8 and 1976-77, p. 12).

MATHURA :

The excavations revealed two phases of mud fortification at Dhulkot, the earlier of which belonged to *circa* third century B.C. and the second to the Saka-Kushan times. In the early phase the fortification was made of compact layers of earth mixed with *Kankar* to a maximum height of 6.45 m with a pronounced slope on the exterior. The outer face was strengthened with oblique packing. Important finds recovered from the core of the rampart were NBP, plain grey ware and other antiquities belonging to the Mauryan Period. In the second phase the defence wall was enlarged. Thus here the earlier phase of the fortification belongs to the Late Phase of NBP and its purpose was to defend the habitation from the attack of enemies.

AHICHCHHATRA :

In the earlier excavation at Ahichchhatra from 1940 to 1944, the defences were tapped at two places. It revealed two successive earth ramparts below a brick wall of the first century B.C. In the excavations of 1963-64, the town had a mud rampart, enclosing the habitation, built in the Kushan Period. It had five structural phases. In the first structural phase, it was built of mud. In the second phase, it was damaged and hence repaired by constructing a brick wall, 4.98 m broad and 2.59 m high, running all along its length. To economize the use of bricks, rectangular gaps, at regular intervals were left. In the third phase, brick wall was protected by a mud cover and in the fourth it was buttressed by another mud-packing. In the fifth phase, the mud-packing was filled with the walls of brick-bats and bricks. Both the excavations reveal that the fortification at Ahichchhatra was built not much later than B.C. 100 and it was a defensive device against enemies. The rivers Ramganga and Gangham are at a very safe distance from the place and even in spate would not have reached the site. The people of the Early and Late Phases of the NBP, therefore, could not feel the necessity of constructing any embankment as a measure against floods.

CHANDRAKETUGARH :

The excavation revealed the remains of a fortified township with five cultural periods ranging in date from the pre-Mauryan to Gupta times. It was built over a ramp of rammed concrete and was made of earth. The core of the earthen rampart yielded cast copper coins and stamped pot sherds. Information published on the fortification is far from precise both in content and chronology. The find of cast copper coins in the core of the rampart, although is not of much significance, except showing that the coins were current before or at the time of the construction of the rampart. The earliest habitation at the site also starts with the Late Phase of NBP. Hence the rampart cannot be assigned any date earlier than 400-300 B.C.

BANGARH :

During the excavation of the site from 1937-41, the main mound was found surrounded by a ditch and earth dug out of it was probably used for building mud rampart walls at the beginning. Various changes and repairs were noticed in the rampart wall by using backed bricks at different levels. Not much is known about the fortification. But it is clear from the excavations that fourth stratum (belonging to the Sunga Period) of Bangarh shows distinct sign of prosperity and the city had by then a brick built wide rampart wall for defence. The earliest habitation at the site starts here also with the Late Phase of NBP and the rampart, therefore, cannot be given an earlier date than the date assigned to this phase of occupation.

The above survey of the fortifications of the Iron Age sites of the Ganga Plains shows that they fall into two chronological groups : (1) those erected during the PGW and Early NBP Phases and (2) those constructed during the Late Phase of NBP. It appears that scholars somehow could not make a distinction[1] between an embankment and a rampart. It seems fairly clear that Jakhera, Atranjikhera, Kampil, Kausambi and Rajghat have embankments and moats (diversion channels) meant to resist floods. These embankments as shown belong either to the PGW or to the Early NBP Phase. Probably with the colonization of the plains by the PGW and Early NBP people, right on the river bank (which were subjected to periodic severe flooding), the need for the erection of these embankments was more pressing than for the erection of rampart against enemies. It was in the Late Phase of NBP, the fortifications were made exclusively for defence against enemies, the evidence of which we get at Kausambi (here the original embankment was converted for defence purpose with certain modifications), Pataliputra, Rajgir, Sravasti, Vaisali, Ahichchhatra, Ayodhya, Champa, Balirajgarh, Katragarh, Mathura, Chandraketugarh and Bangarh. In contrast to earlier embankments which were only of mud they have rampart earthen walls of bigger dimension and have as a rule baked brick or timber parapet over them. Such structures no doubt have enclosed real cities as the need for defence against enemies was more pressing during this period. The evaluation of archaeological evidence points to the evolutionary trend in the character of the fortifications from the PGW or Early Phase of NBP to the Late Phase of NBP.

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1. Even, A. Ghosh who makes clear distinction between two chronological groups in fortifications viz. those erected in *circa* 600 B.C. and those erected in 200 to 100 B.C., probably thinks that all the fortifications were constructed for defence against enemies. See A. Ghosh, *The City in Early Historical India*, (Simla, 1973), p. 66.

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Material Culture of the PGW, Early NBP and Late NBP Periods-II

1. METAL TECHNOLOGY

A. COPPER OBJECTS

Copper Objects from the PGW and Early Phase of NBP :

Among the illustrated objects of copper found in association with the PGW phase (Period II) of Hastinapura are an antimony rod of round section (from the accumulation following the erosion in Period II), an arrow-head, a nailparer (from the accumulation following the erosion in Period II) and a borer, the top of which was ornamented with incised lines forming diamond-pattern and a folded circular disc of thin section (from the accumulation following the erosion in Period II). At Atranjikhera, twenty two copper objects including antimony rods, nail-parers, rings, fishhooks, pin, bangles, celt, clamp and dish were found from the PGW levels. In the PGW deposit at Jakhera sixteen copper objects were recovered. They include antimony rods, nail-parer, hooks, bangles, needles and a few unidentifiable objects. From PGW phase, antimony rods are also reported from Alamgirpur, Hulas, Noh and Thapli in Tehri Garhwal and arrow-heads and nail-parers also from Allahapur. The antimony rod, nail-parer and borer (all found at Hastinapura) deserve notice as roughly similar specimens have been reported from the Early Phase of NBP at Sravasti (Period I). Antimony rods are also found in the Early Phase of NBP at Takiaper. The pins, needles and bangles[1] so common at Atranjikhera and Jakhera also occur in the Early Phase of NBP at Sravasti. Besides these the other objects from Sravasti are a bell-pendant and a ear-ring. Three copper vessels are reported from Period III of Sringverapura but it is not clear whether they come from the Early or Late Phase of NBP ?

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[1] In the contemporary levels (PGW and NBP), Khalaua has also yielded a fragmentary copper bangle.

Copper Objects from Late Phase of NBP :

Antimony rods continue to occur in the Late Phase of NBP at Hastinapura (Period III), Rajghat, Buxar, Champa, Katragarh, Ahar, Prakash, Maheshwar, Nasik and Nevasa. Besides this other object of copper from this phase are reel or spool, a brooch or a piece of a chain, a cap for a stick-handle or a ferrule with provision for nails and bangles, all from Hastinapura; pin, brooch and bangles, all from Sravasti; lid with a ring handle or hollow body of a bell and a ring, all from Prakash; ring and knife blade from Ahar; a poller and a fragmentary ring from Navdatoli; a shallow dish, a stand, bangles and a decorated fragment of a vessel all from Nasik; a bangle, a bead, pendant, rings, blades, hooks, rods and wire pieces, all from Nevasa; a bell and a ferrule from Kausambi.

Observation :

1. The above inventory of copper objects show that copper continue to occur significantly in the PGW and Early NBP Phases even after the introduction of iron.

2. The copper objects from both these levels (PGW and Early NBP) are more or less similar. The agricultural implements and the objects of war and defence and structural use are totally absent. Hunting tools like arrowheads are rare. Majority consists of objects of toiletary and household use. The commonest object, however, is the antimony rods[1].

3. In the Late Phase of NBP antimony rods along with other objects of household use continued to occur. But this period was noted for objects of ornamental use along with posts and utensils. Of singular interest is a shallow dish of copper found in association with the Late Phase of NBP at Nasik. This shallow copper dish with broad, flat base and flaring sides is decorated on the inner side by a concentric groove.[2] Such types of vessels in earthen ware are also found in coarse grey ware and coarse NBP and are one of the characteristic feature of the Late Phase of NBP. Among copper objects this is a new corroborative evidence for the Late Phase of NBP. Equally interesting is a fragment of an inverted rim of a vessel through which copper wire runs round. The out side of the vessel was decorated with a dot and circle design. This is also reported from the Late Phase of NBP at Nasik. Other Objects of fine workmanship from this phase are a bangle

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[1] The description of this object as antimony rod is based on its function rather than on its metal content. For metallographic examination of Prakash and Rajghat antimony rods have shown that they do not contain antimony but are copper alloyed.

[2] H.D. Sankalia and S.B. Deo, *Report on the Excavations at Nasik and Jorwe, 1950-51*, (Poona, 1955), p. 109, Fig. 51, a.

inlaid silver and gold threads from Nasik and a bangle wlth interlaced knots from Sravasti. All this show the presence of specialized craftsmen and a peaceful peasantry during this phase.

B. IRON OBJECTS :

The occurrence of iron in the microlithic/chalcolithic context has been reported at the three excavated sites (one open air and one each in the rock-shelters on the Morahana Pahar and Baghai-Khor) near the village Bhainsaur in District Mirzapur[1]. The deposit in the open air trench comprised six layers, of which layer 6 was devoid of any human occupation. Layer 6 yielded non-geometric microliths without any pottery. In layers 4 and 3 microliths of geometric type associated with pottery were found. Layers 2 and 1 yielded both the series of microlithic and the same class of pottery. From layer 1 was obtained an arrow-head. The excavation at the rock shelters yielded evidence exactly similar to the one obtained from the above open air site and here also iron objects including arrow-heads were obtained from layer 1. Occurrence of iron in post-chalcolithic context has come to light in a few excavations conducted on the sites of Ganga Plains. Koldihwa contained the relics of three cultures-Neolithic, chalcolithic and Iron Age. Layer 1 of the Iron Age (the top deposit at the site) and the pits sealed by it have yielded an unperforated axe, arrow-head, slags and crucibles along with the potteries similar to those of the preceding chalcolithic phase. It is said that except for iron, the other material equipment of the Iron Age was same as that of the preceding chalcolithic phase[2]. Sub-period IB of Chirand was marked by the emergence of several 'specimens' (detail not known) of iron objects, the other assemblage of the preceding chalcolithic phase like black-and-red ware (both plain and painted) and black slipped ware (both plain and painted) otherwise remained unchanged. At Pandu Rajar Dhibi iron objects, like a bar celt, an arrow head, points, blades and slags are introduced at the site in Period III, while the chalcolithic pottery of the preceding Period II (chalcolithic) continued. The occurrence of iron objects like arrow-heads, spear-heads, chisel and nails as well as large quantities of iron ore and slag was a new feature at Mahisdal, Period II, while the ceramic of the preceding chalcolithic phase (Period I) continued as usual[3]. Period II of Bharatpur which shows an overlap with the preceding late chalcolithic phase (Period I) was marked by the introduction of iron implements (details not known)[4]. The upper levels of Period II of this site however yielded a few sherds of NBP. The excavations at Tulsipur (District Bankura) revealed three phase of occupation, the earliest was represented by

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1. *Indian Archaeology*, 1962-63, *A Review*, (1965), pp. 37-38.
2. *Indian Archaeology*, 1973-74, *A Review*, (1979), p. 27.
3. *Ibid.*, 1963-64, *A Review*, (1967), p. 59.
4. *Ibid.*, 1967-68, *A Review*, (1969), p. 51.

black-and-red, gritty red and micaceous wares along with some floors and iron (details not given). In the next phase iron was also present along with a few chalcolithic red ware and some black-and-red ware. The last phase was characterized by a bright red ware[1]. At Barudih an iron sickle has been reported from a deposit which has yielded neolithic tools and chalcolithic pottery[2]. At Sonepur in Sub-period IB, iron in the form of socketed hoe and slags occur in small quantity along with the potteries of the preceding Sub-period IA which was chalcolithic.

There are definite evidence of Iron in the form of small fragments and shapeless bits from the pre-PGW horizon[3] (Period I) in Structural Period I. 3 dated round about from *circa* 1025 B.C. to 955 B.C. at Kausambi. Distinctive shapes, however, start, appearing in the socalled PGW phase (Period II). Jakhera, another site of the upper Ganga Plain South, yielded a few tangible iron object including arrow-head and a complete blade of sickle from Period IIA (called proto-PGW[4] by the excavator) in association with the same pottery complex of the preceding Period I. Period IIB at this site belongs to the mature PGW phase with iron objects in large number.

Iron with PGW has been reported from Autha and Daulatpur in Haryana; Hastinapur, Allahapur, Hulas, Alamgirpur, Sonkh, Atranjikhera, Jakhera, Batesvara, Ahichchhatra and Kausambi in Uttar Pradesh; Noh, Bairat and Jodhpur in Rajasthan. However, we shall present here an inventory of objects only on the sites of the Ganga Plains.

In the digging of 1954-56, the evidence of iron at Hastinapura was confined to a couple of slags found at a late level of the PGW deposit. But in the small scale excavations conducted at the site in 1962 actual specimens of finished object in the form of nails, an arrow-head and knife-blades were found from the mid level of the same deposit. The PGW deposit at Alamgirpur yielded a spear-head, arrow-heads, nails and pins. Although no iron was reported at Ahichchhatra in the digging of 1944-45 but the subsequent excavation of 1963-64 clearly indicate the use of iron in the PGW deposit. But the details are not reported. From Allahapur, Period IA yielding PGW, were found iron objects like spear-heads, arrow-heads, blades, rods pins and nails alongwith numerous bits and slags throughout the deposit. Sonkh yielded lumps of iron slag with PGW in Phase I (called pre-Mauryan).

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1. *Ibid.*, 1967-68, *A Review*, (1968), p. 50.
2. D. Sen, 'Profile of a Proliterate Culture in Sanjai Valley', *Journal of Indian Anthropological Society*, volume IV, (1969), pp. 17-29.
3. Iron in the form of 'shapeless bits' has been also reported from the pre-PGW horizon (Period II) of Noh.
4. According to our findings the PGW phase at Jakhera starts right from Period IIA as the main bulk of pottery from this phase is similar to the associated wares of the PGW phase of other sites like Hastinapura and Ahichchhatra (*Supra*).

Hulas also yielded iron slags from the PGW deposit (Period II). In the PGW phase (Period II) of Kausambi, arrow-heads and spears were more common. The earliest spear (leaf shaped with a small blade), however, has been reported from the level assignable to *circa* 745 B.C. at Kausambi. On the basis of the information obtained from M.D.N. Sahi, six season's (1962 to 1968) of excavations at Atranjikhera, provided the richest yield of iron objects from the very beginning[1] of the PGW phase at the site. In all 104 objects of iron, including 7 slags and 13 indeterminable objects, were found. The shapes which could be identified are : arrow-heads, spearheads, shafts, pair of tong, hooks, nails, clamps, chisel, bars, borers, needles, axes, knives and bangles or rings. From the mature phase of PGW (Period II B) at Jakhera about 41 objects were found. They include arrow-heads, spear-heads, celt, chisels, sickles, daggers, axe, plough-share (?) and large number of chunks of iron slags. Iron is reported from PGW phase (Period I) at Batesvara but details are not known.

Outside the Ganga Plains at Autha, iron occurs mainly in the form of lumps from the earliest layer associated with the PGW. From the upper levels of PGW deposit (Period II) at Daulatpur two iron implements were found. From Noh PGW phase (Period III) we have arrow-heads, spearheads, an axe and several pieces of iron slags. The earliest occupation belonging to the PGW (Period I) at Bairat also yielded iron slags. However, the significant discovery from the PGW phase (Period III) from Jodhpura are two furnaces for the forging and smelting of iron along with a big lump of haematite ore lying close to the furnace[2]. Other objects associated with PGW were arrow-heads. Some sites in Madhya Pradesh such as Ujjain, Kayatha, Besnagar, Jaderua and Katwar are repoted to have yielded PGW and iron but since the PGW is not the dominant ceramic at these sites they are not dealt here. On the other hand, there are some sites associated with the PGW phase such as Ropar, Bhagwanpura, Nagar, Kathpalon, Dadheri, Kanauj, Kampil, Mathura, Kaseri, Kashipur etc., which have not yielded any iron for one or other reasons.

Iron has been reported from the Early Phase of NBP from large number of sites such as Sravasti, Ahichchhatra, Khalaua, Atranjikhera, Jakhera, Kausambi, Rajghat, Prahladpur, Takiaper, Sarai-mohana, Chirand, Sonepur, Pataliputra, Rajgir, Oriup, Vaisali, Sohagaura and Bharatpur. From Sravasti (Period I) the objects are an arrow-head, nails and an elephant goad (*Ankush)*. From the Early Phase of NBP, distinguished by the presence of PGW and NBP (Period III A), 82 objects were recorded from Atranjikhera but the details of

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1. An iron object (Shaft ?), which could not be taken out completely as half of it was inside the balk, was found lying between the top level of the deposit of Period II characterized by the presence of plain black-and-red ware and the lowermost deposit of Period III marked by the presence of PGW. By implication it should be from the earliest deposit of the PGW at the site.
2. Vijay Kumar, 'Excavations at Jodhpura (District Jaipur)', a paper read at the Indian Archaeological Society Conference at Jaipur in December, 1976.

these objects are not known[1]. Objects from the Early Phase of NBP (Period III) of Jakhera are arrow-heads with wooden shaft or tang, ladle (?), door-sockets, spearheads, rods, nails, iron shaft with bone arrow-head, chain, knife, flat rectangular chisel and slags. This phase of Jakhera is also characterised by both PGW and NBP. From the Early Phase of NBP at Rajghat we have arrow-heads, nails, knife blades, chisels (?) and a few objects of indeterminate shapes along with slags. At Prahladpur, a fragment of an arrow-head (?) and slags are clearly reported from the Early Phase of NBP. Iron has been also reported from the Early Phase of NBP at Vaisali, Takiaper, Sarai-mohana and Masoan. The objects at Masoan are an arrowhead and a spear point. At Kausambi small bits of iron were discovered as early as Structural Period 1.3 dated from *circa* 1025 B.C. to *circa* 955 B.C. But the distinctive shapes start appearing from Structural Period II 5 dated from *circa* 885 B.C. to *circa* 815 B.C. *i.e.* from the so-called PGW phase and the iron became much more numerous with the beginning of the Early Phase of NBP (Period III). Arrow-heads and spears which were common in the PGW phase were used widely also in the Early Phase of NBP. Among the illustrated objects from this phase is a single tanged arrowhead, an adze and a nail. The phasewise position of other objects like axes, knives, chisels, sickles, iron rings is not clear although they find mention in the report. In the overlap phase of PGW and NBP (Period II) *i.e.* in the Early Phase of NBP, iron at Ahichchhatra is reported but details are not available. Iron is reported from the Early Phase of NBP (Period I characterised by the presence of PGW and a single piece of NBP) at Khalaua but here also the details are not given. Kumrahar and Pataliputra (modern Patna) have both yielded considerable number of iron objects but in the absence of period-wise or phase-wise distribution, details could not be worked out. However they are definitely associated with Period I characterized by the use of NBP. In the Early Phase of NBP at Sohagaura (Period III) and Rajgir (pre-structural phase of NBP), there is evidence of iron but the details are not known. Sonepur and Chirand also yielded iron objects from the Early Phase of NBP. It has been noticed that iron appears in various shapes like sword, javeline or spear lances, daggers, blades, arrowheads etc. which go to show that the use of iron increased during the NBP phase[2]. Iron spearheads and nails were recovered from the earlier levels of the deposit yielding NBP in Period II at Oriup. Bharatpur, (Period II) which overlapped with the preceding Period I, was marked by the introduction of iron implements (detail not known) and a few NBP. Iron has been reported from Period IV which among other finds was marked by the presence of a few sherds of NBP. The earlier period (Period III) also yielded iron objects. Iron has been also reported from the contemporary levels of Mahisdal (Period II) Tulsipur (1st and 2nd Phase) and Koldihwa (Iron Age

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1. However, we are informed that 218 objects were recovered from both Period IVA and IVB *i.e.* from the Early and Late Phases of NBP. They include arrowheads, spear-head, shafts, sickle, spade, ploughshare, hoe, pipes, clamps, sockets, chisels, ring fasterners, choppers, borer, scrapper, axe, knives, plumb bob, discs besides 21 lumps of iron slag and several objects of indeterminate shapes. It is difficult to say which objects were from the Early and which were from the Late Phases of NBP ?
2. Sachchidanand Sahai, in *Potteries In Ancient India*, (Patna, 1969), p. 151.

deposit) although we do not get NBP from these sites. The Early Phase of NBP of some sites have not yielded any iron objects. Such sites are Bhita, Sringverapura (Period IIIA), Mathura IB, Ayodhya (from the earliest stage of habitation dated to early 7th century B.C.) and Tamluk II, etc.

Iron became much more prolific and acquired the position of the common metal in the Late Phase of NBP than the preceding phases of the PGW and theEarly Phase of NBP. In the Late Phase of NBP, it is reported from Kausambi (late levels of Period III), Sringverapura IIIB and IIIC, Jajmau I, Atranjikhera IVB, Batesvara II, Mathura II and III, Sonkh Phase II onward, Hastinapura III, Allahapur IB, Sravasti II, Ahichchhatra II (late phase). Prahladpur IC, Rajghat IC, and II, Sarai-mohana IC, Masoan II, Buxar I, Chirand III (late levels), Sonepur II (late levels), Patna II (structural phase), Rajgir II (defence phase), Kankarbagh I, Apsad I, Champa I, Ayodhya I (late deposit), Sohagaura III (late deposit), Chandahadih I and II, Checher Kutubpur II (late deposit) and Balirajgarh I. But the details of the objects are not available from many sites.

Outside the Ganga Plains, iron, from the Late Phase of NBP, is reported from Taxila, Ropar, Sisupalgarh, Tripuri, Maheshwar, Navdatoli, Ujjain, Nagda, Kayatha, Tumain, Jaderua, Avra, Bairat, Nagari, Sambhar, Rairh, Ahar, Noh, Nagara, Timberva, Dhatva, Prabhas Patan, Prakash, Bahal, Nasik, Nevasa, Pauni, Kaundiyapur, Ter, Paunar, Sugh, Kaseri, Bilawali, Besnagar, Eran, Jaugada and Purana Qila.

We shall first give the details of the iron objects available from sites of the Ganga Plains. Although the exact number of objects recovered from the level associated with NBP (Period III) at Hastinapura in not known, the objects illustrated are a barbed and socketed arrow-head, a chisel, a chisel blade and a bracelet-shaped object with unconnected ends. At Sravasti the objects recovered are different kinds of knives, blades, a leaf-shaped spear-head, nails, arrow-heads, chisel, a floox and a socket fragement possibly belonging to a spade. At Kausambi a single tanged arrow heads (KSB, Type H), socketed arrow heads (KSB, Types, E1 and E2) and double-tanged arrow heads (KSB, Type I) are profusely illustrated. In this phase of Kausambi spears, javelins, ring or socket and door-hook are also found. About 218 iron objects were found from Atranjikhera Period IV demarcated into Early and Late Phases of NBP. From the Early Phase of NBP, 82 objects were found and the remaining 136 were from the Late Phase of NBP. Among the objects of Period IV are included arrow heads, spear head, shafts, sickle, spade, ploughshare, hoe, pipes, clamps, sockets, chisels, ring fasteners, choppers, borer, scrapper, axe, knives, plumb bob, discs and iron slags. It is difficult to find out the details in case of other sites.

By the time, the distinctive cultural phase of the Late Phase of NBP reached outside the Ganga Plains, iron became very prolific. It was produced in diverse forms and shapes. Numerous sites yielding iron alongwith NBP which have been excavated outside the Ganga Plains are given above. But the details of the iron objects from only a few are available. This is given below :

The only object recovered from Taxila in a context going back to fifth century B.C. is a short dagger blade. The next phase dated to 4th century B.C. yielded a carpenter's adze and knives. The next Mauryan phase was quite rich and was represented by a bowl, spoons, saucepans with loop handles, daggers, javelins, arrowheads, an elephant goad, a socketed axe, adze, chisel's, knives, a gold smith's tong, smith's anvils, nails and hoes. In the Late Phase of NBP at Ropar the objects are daggers, spearheads, sickles, knives, nails, hooks, bars and spikes. The excavations at Sisupalgarh did not yield any iron object from Period I dated from *circa* 300 to 200 B.C. But Periods IIA and IIB dated from *circa* 200 B.C. to A.D. 200 yielded a fair number of objects. Both these Periods I and II according to our findings corresponds with the Late Phase of NBP and would therefore also need a slight revision in dates. The iron objects illustrated from Period IIA are : spikes, staple, clamp, rings and an indeterminate object bent at ends in opposite direction. The illustrated objects at Tripuri in the deposits of Period II dated to 400-200 B.C. are nails and rectangular rings. The objects at Maheshwar-Navdatoli from Period IV associated with NBP are leaf shaped and tanged arrowheads and a hoe. At Ujjain, an iron industry was documented, where the evidence of smelting and forging of iron is available. Lumps of calcite or aragonite crystals occur sporadically in the occupational deposits as well as on surface. This is by far the most unique evidence and suggests the manufacture of iron objects at the site. Other objects recovered are mainly arrowheads, spear-heads, chisels, knives, daggers and sickles As against 59 objects of iron from the pre-NBP levels (Period II) of Nagda the Late Phase of NBP (Period III dated from 500 B.C. to 200 B.C.) has yielded 130 objects in all. Noteworthy are, a *khadga*-shaped knife, daggers (double-edged), chisels, sickles, hoes, arrow-heads occasionally with tangs, nails and bowls. At Tumain, Period I yielded javelin tips, nails and arrowheads, while Period II, in which the frequency of NBP was reduced, yielded arrow-heads, nails and spearheads. At Jaderua, Period IIA dated from *circa* mid-fourth to second century B.C. and characterised by the introduction of NBP, yielded chisels, spearheads, arrowheads and a large sickle. The presence of large quantity of slags of iron suggests extensive iron-smelting at the site. Avra also yielded spearheads, nails, looped, hooks, a sickle, chisel and a lamp in NBP levels (Period III). In the earlier excavations of Bairat the objects recovered were nails from the monastery area, and iron clamps, nails, fish plates and chisels from the temple area. Though Nagari, Sambhar and Rairh did not yield NBP, yet their deposit on the basis of other cultural equipments can be associated with the Late Phase of NBP. From Nagari iron objects like arrowheads and nails were reported by Bhandarkar from a deposit dated to 3rd century B.C. At Sambhar, the objects are chisel, mouthpieces of blacksmith's bellows, daggers, sickles, staples, crucibles, fish plates, arrow-heads, spearheads, bells, braces rings, spoons, hatchets, door pivot, a stirrup, laddles and large cylindrical vessel. The occupation at the site was thought to go back to 300 B.C. The oldest habitation ascribed to 300 B.C. at Rairh also yielded iron objects like sword blades, lances, daggers, knives, sickles, axes, edges, nails, door fittings and fragments of door chains.

Although iron had a much earlier beginning at Ahar, the objects associated with NBP (*i.e.* Period IIA) are two arrow-heads and a ring. Period II marked by the introduction of NBP at Nagara yielded iron objects like nails, fragments of a arrowhead and corroded borken ploughshare have been reported. At Prakash as against 25 objects recovered from the pre-NBP deposit, only six are from the mid and late levels of Period II *i.e.* from the Late Phase of NBP. Out of this the five illustrated are rod, clamp, nail-head or stopper and two celt like axe-heads. The iron objects from Period II of Nasik (dated from 400-300 B.C. to 50 A.D.) comprises mainly leaf-shaped arrowheads, caltropes choppers, axes, drills, chisels, knives, lamp or ladle, rings and nails, suggesting a wide variety of uses and development of iron industry. The objects recovered from Period IV of Nevasa are two arrowheads, one chisel, 12 knive blades, 16 tongs, 2 sickles, one spearhead, a hook, a drill, a small pot, a bowl, a ladle, 6 clamps, 6 rin-holds, 17 nails, a socketed handle and 4 bangles. At Pauni, Phase I which was characterised by the use of NBP, was devoid of any iron object. Three objects were recovered from Phase II and some from Phase III which was distinguished by the advent of Red Polished Ware although NBP continued in it. The iron objects comprised nails, chisels, sickle, ladle, lid and rod. The absence of tools of war and defence at the site was ascribed by the excavators due to the influence of Buddhism. Excavations at Kaundiyapur revealed tanged arrowheads from the NBP levels *i.e.* layers 7 and 8. Period IIA of Paunar is marked by the introduction of iron objects such as nails, arrowheads, blades, chisel, sickles and rings. From Period IIB which shows overlap of black-and-red with Red Polished Ware, the objects recovered were nails, blades, spearheads, tanged and leaf-shaped arrowheads, clamps and hooks.

There are some sites which correspond with the Late Phase of NBP or the Late Phase of Iron Age but they have not yet yielded any iron objects. This absence may be accidental and largely due to the fact that digging in these levels was confined to a small area. Such sites are Kanauj, Alamgirpur, Kesari, Hulas, Kalsi, Pariar, Hulaskhera, Manwan, Piprahwa-Ganwaria, Lakhneswar-Dih, Katragarh, Vaisali, Tulsipur, Tamluk, Chandraketugarh and Bangarh etc.

Observations :

1. In the Middle and Lower Ganga Plains, the earliest[1] iron is supposed to occur in the microlithic/chalcolithic context at one open air settlement and two rock shelters near the village Bhainasur in District Mirzapur, although the evidence is not yet clear. In post-chalcolithic/pre-NBP context of black-and-red and black slipped wares (both plain and often painted) it is found at Koldihwa, Chirand, Pandu Rajar Dhibi, Mahisdal, Bharatpur,

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[1] The evidence of iron in such an early context has been also pointed out by M.D.N. Sahi at Tilwara and Bagor in Rajasthan and Pachad in Maharashtra. But these evidences are not clear. He has also pointed out for the first time the earliest datable context of two iron arrowheads from layer 5 of Trench X of Period IC at Ahar. The charcoal sample collected from this layer has been dated 1283±110 B.C. (TF. 31). If the arrowheads are from regular layer and the concordance of layers of different trenches is not arbitary, the existence of iron at Ahar to round about 1200 B.C. is well indicated.

Tulsipur, Barudih and Sonepur. Iron occurs in the form of arrowheads, spear-heads, chisels, a sickle (only at Barudih), nails, unperforated axe, celt, socketed hoe, a crucible (only at Koldihwa) and ores and slags. It is important to note that the preceding chalcolithic element continue to exist even in this Early Phase of Iron Age. It is in the upper levels of this Early Phase of Iron Age that NBP appears on the scene with much more iron.

2. In the Upper Ganga Plain, the earliest iron is supposed to occur in post-chalcolithic/pre-PGW horizon of black-and-red and black slipped ware at Kausambi. It is in the form of small fragments and shapeless bits. In a similar context and in the form of shapeless bits iron is also found at Noh. But the evidence is not very clear. Although there is complete identity of cultural elements of Kausambi I and Noh II (in which the above iron is reported) with the corresponding levels of Atranjikhera II, Jakhera I, Jodhpura II and Sringverapura II, these sites have not yet yielded any iron objects. In the upper levels of this lingering phase of the chalcolithic culture/Early Phase of Iron Age, that PGW appears on the scene with much iron and with distinctive shapes. The preceding chalcolithic element in the form of black-and-red and black-slipped wares (plain) continue to exist significantly even after the introduction of PGW in this Early Phase of Iron Age. Iron occur in the form of arrowheads, spear-heads, chisels, sickles (only at Jakhera), nails, axes, knives, tongs, needles and daggers (only at Jakhera) etc. along with ores and slags.

3. The evidence of iron smelting at Jodhpura along with large number of finished objects of iron, ores and slags found from the very beginning of the PGW and Early NBP Phases imply a period of evolutionary development, pushing the beginning of the iron further backward in point of time. The view that PGW people were the earliest users of iron and that limited use of iron was known to them does not hold good now.

4. The inventory of the iron objects from the PGW and Early NBP Phases show that they are more or less the same. Their tool-kit show a hunting bais because arrowheads and spear-heads are very common in both these phases. The tools of war, defence and of specialized nature such as sickles (found at Barudih and Jakhera) and daggers (only found at Jakhera) are very rare. The pots and pans are totally absent.

5. Although the metal was not scarce both in type and frequency in the PGW and Early NBP Phases but with the beginning of Late Phase of NBP or the Late Phase of Iron Age, the use of iron became all pervasive and varied. The objects from this phase could be grouped into the following categories :

(i) Weapons of war and defence :

These comprise spear-heads, arrow-heads, adze, blades, javeline, axes, drills, caltropes and a *khadga*-shaped knife etc.

(ii) Objects of household and structural use :

This group comprises objects like nails, clamps, pounder, door-rings, knives, bells, crucibles, fish-plates, lamps, door-fittings and fragments of door chains and hooks etc.

(iii) Pots and Utensils :

This category comprises bowls (even rimless), spoons, a large cylindrical vessel and saucepans with loop handles.

(iv) Tools of specialized jobs :

The abundance of sickles is significant. They were used for agricultural field work. A socket fragment of a spade from Sravasti also might have been used for such work. Other specialized tools were a carpenter's adze and knives from Taxila; smith's anvil and tong also from Taxila, a elephant goad also from Taxila, and mouth pieces of blacksmith's bellows from Sambhar.

(v) Objects of ornamental use :

The objects of this category comprise bangles from Nevasa, a bracelet from Hastinapura, rings from Nasik and Nevasa and a model of a serpent from Kausambi. The last can be also an object of worship.

All this imply an advanced knowledge of iron technology and reflect the many-sidedness of its use. These further imply a fairly long period of evolutionary development.

C. COPPER METALLURGY

Forbes[1] gives three stages in the evolution of copper metallurgy :

1. Native metal as stones.
2. Native metal stage (hammering, cutting etc.).
3. Ore stage (from ore to metal).

This also holds good for iron. It is clear that the occurrence of more copper or iron in an archaeological deposit does not qualify it to be included in Copper or Iron Age. The real metal age starts with Forbes's Stage 3 viz. extraction of copper. In order to understand the role of metal technology, it is desirable to understand the various stages through which copper metallurgy passes. We shall take up the various stages of copper metallurgy as given by Forbes.

The first stage consists of the shaping of the native copper by hammering, cutting, bending, grinding and polishing. The second stage is annealing native copper by heating and hammering. The third stage consist of smelting ore in wood charcoal fire over a clay lined pit with air. The slag and regulus are to be discarded. In the fourth stage the native copper is melted over furnace or fire in a crucible and then casting is done into stone, clay or sand moulds. In fifth stage there are various processess involved in smelting and refining the sulphide ore. At this stage copper has to be alloyed with other casting properties to improve its hardness and strength. The various technique of metal forging that were used in ancient times with special reference to India are hammering, spinning and cold work.

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[1] R.J. Forbes, *Studies in Ancient Technology*, vol. VIII, (Leiden, 1964), pp. 16-19.

We have already seen that large number of copper objects are reported not only from the PGW and Early NBP Phases but also from the Late Phase of NBP. Does the copper metallurgy of these Iron Age deposits show any similarity ? To answer this let us see the result of the analysis done on the objects found from these deposits (See Table 2).

On the basis of the chemical composition of the copper base material from the PGW pre-NBP, Early NBP and Late NBP Phases from Hastinapura, Sonepur, Rajghat, Kausambi, Taxila and Prakash (Table 2), the following observation may be made :

Copper objects from Hastinapura PGW (serial numbers 1 and 2) deposit, Sonepur pre-NBP deposit (serial no. 3), Rajghat Early Phase of NBP deposit (serial nos. 4, 5 and 6) and Kausambi Early Phase of NBP deposit (serial no. 7), are the earliest analyzed objects[1] from the Early Phase of Iron Age of Indian sub-continent. The chemical analysis of all these objects reveals the following :

(1) The major metallic constituent was unalloyed copper ranging in content from 95.45% to 98.43%.

(2) Tin, Lead, Arsenic, Iron, Nickel and Zinc, appear as impurities. These are never more than 1% (except Sonepur specimen where tin is 1.37%-serial no. 3) and hence could not be deliberate alloys[2]. These impurities could be due to the use of impure ores. Possibly, in the beginning of the Iron Age, to which these samples belong, the surface outcrop of mine were tapped instead of going deep and hence we get these impurities.

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[1] Bronze fragment from Kausambi at serial number 8 can seemingly by placed in both the phases of NBP.

[2] There is considerable difference of opinion on the definition of alloy. Coghlan includes only alloys containing 5% to 15% tin in the category of bronzes. Below 5% he places them into accidental bronzes. Tylecote has worked out groups of copper for England. From his histogram it is clear that less than 1% tin or arsenic in a object may be due to impurity and they may be termed pure copper. Thomson claims that copper with less than 1% of tin or arsenic could not be deliberate alloys, For details see : H.H. Coghlan in C. Singer, E.J. Holm Yard and A.R. Hall, *History of Technology*, Vol. I, (Oxford, 1954); R.F. Tylecote, *Metallurgy in Archaeology*, (London, 1962) and D.P. Agrawal, *The Copper Bronze Age in India*, (New Delhi, 1971), pp. 158-160.

TABLE—2

Percentage Composition of Copper Base Material from the PGW, pre-NBP, Early NBP and Late NBP deposits

S. No.	*Name of the site*	*Nature of the object*	*Period and Cultural Context*	*Cu*	*Sn*	*Pb*	*As*	*Sb*	*Fe*	*Ni*	*Zn*	*SiO_2*	*Co*	*CaO*	*Mgo*	*S*	*O_2*	*Total*	*Done by & Reference*
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	Hastinapura	Copper Number-1126	Period II—PGW Deposit	97.95	0.40	0.10	0.48	—	0.38	0.38	0.90	—	—	—	—	—	—	99.69	T. R. Gairola, *Ancient India*, Nos. 10 & 11, p. 13.
2.	Hastinapura	Copper Number-1585	Period II-PGW Deposit	97.89	0.63	0.10	0.34	—	0.52	0.20	0.55	—	—	—	—	—	—	100.23	Do
3.	Sonepur	Copper Rod	Sub Period IA-pre-NBP Deposit	98.43	1.39	—	—	—	—	—	—	0.17	—	—	—	—	—	99.99	Chemistry Dept., Patna University—The Copper Bronze Age in India, (1971), p. 169.
4.	Rajghat	Copper Fragment	Sub Period IB-Early Phase of NBP	98.05	—	Tr	+	—	0.37	0.08	—	—	N D.	0.85	0.17	Tr	—	99.52	H.C. Bhardwaj, *Puratattva*, No. 2, (1968-69), p. 32.
5.	Rajghat	Antimony Rod	Sub-period IB-Early Phase of NBP	96.38	—	—	+	—	0.21	0.08	—	—	N.D.	2.31	0.84	0.75	—	100.57	Do
6.	Rajghat	Copper sheet	Sub-period IB-Early Phase of NBP	95.45	—	—	0.25	Tr.	0.96	0.15	—	—	+	1.75	N.D.	0.20	1.24	100.00	Do

Contd.

TABLE—2 (Contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
7.	Kausambi	Copper Fragment	*C.* 535-465 B.C.-Early Phase of NBP	98.07	0 98	Tr.	Tr.	—	0.80	0.13	—	—	—	—	—	—	—	99.98	S. Prakash and N.S. Rawat, *Chemicai Study of Indian Archaeological Antiquities, (U. P.).*
8.	Kausambi	Bronze Fragment	*C.* 535-465 B.C.-Early Phase of NBP ?	79.21	19.13	—	0.27	—	0.51	Tr.	0.88	—	—	—	—	—	—	100.00	CSIR, Monograph No. 10, (1965).
9.	Rajghat	Copper Bangle	Sub-period IC (400-200 B.C.)-Late Phase of NBP	93.93	1.82	Tr.	+	—	1.09	0.32	—	—	—	1.86	0.38	0.48	—	99.88+ 0.32 (Residue) =100.20	H.C. Bhardwaj, *Puratattva,* No. 2, (1968-69) p. 32.
10.	Rajghat	Bronze Coin	Sub-period IC (400-200 B.C.)-Late Phase of NBP	86.90	7.83	0.83	+	—	1.50	1.07	—	—	+	—	—	Tr.	1.87	100.00	Do
11.	Rajghat	Bronze Fragment	Sub-period IC (400-200 B.C.)-Late Phase of NBP	79.40	13.99	0.09	Tr.	Tr.	2.23	—	—	—	+	2.46	0.74	Tr.	—	98.91 + 0.84 (Residue) =99.75	Do
12.	Sonepur	Bronze Fragment	Period II-Late Phase of NBP	87.98	1.88	6.98	—	—	—	—	—	3.24	—	—	—	—	—	100.08	Chemistry Dept , Patna University.

Contd.

TABLE—2 (Contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
13.	Sonepur	Bronze Fragment	Period II-Late Phase of NBP	64.89	32.42	—	—	—	—	—	—	2.69	—	—	—	—	—	100.00	*The Copper Bronze Age in India*, (1971), p. 169.
14.	Taxila	Copper Rod	*C.* 400 B.C.	98.33	0.19	Tr.	0.19	0.35	0.45	0.51	—	—	—	—	—	—	—	100 02	
15.	Taxila	Copper Rod	*C.* 400 B.C.	87.24	8.28	0.94	0.55	0.46	1.23	0.91	—	—	—	—	—	0.39	—	100.00	*Arch. Surv. of India An. Report*, (1930-34) and (1935-36), pp. 132-133.
16.	Taxila	Copper Neck of a Vase	*C.* 300 B.C.	55.39	4.25	3.08	—	3.26	1.77	0.40	34.34	—	—	—	—	—	—	99.49	
17.	Prakash	Antimony Rod	Lat Phase of Period II *i.e.* Late Phase of NBP	95.12	Nil	2.21	Nil	Nil	—	Nil	Nil	N.D.	—	N.D.	N.D.	N.D.	N.D.	97.33	V.T. Athavale, *I.A.*, Nos. 20 & 22, pp.131-136.
18.	Prakash	Lid-7	Late Phase of Period II *i.e.* Late Phase of NBP	61.32	19.43	5.87	Tr.	Nil	1.04	Nil	Nil	1.65	—	Tr.	Tr.	0.32	N D.	89.63	–Do–
19.	Prakash	Ring-11	Late Phase of Period II, *i.e.* Late Phase of NBP	77.88	Nil	Nil	Tr.	Nil	1.70	Nil	17.75	N.D.	—	N.D.	N.D	N.D.	N.D.	17.33	–Do–

(3) The antimony rod examined from the Early Phase of NBP at Rajghat (serial no. 5) does not contain antimony but is pure copper.

From the Late Phase of NBP or the Late Phase of Iron Age, eleven objects were chemically analyzed and on this basis we my infer that :

(1) Alloying was well known from all the sites. Tin-alloying is reported from Rajghat (serial nos. 9, 10 and 11), Sonepur (serial nos. 12 and 13), Taxila (serial nos. 15 and 16) and Prakash (serial no. 18). But objects from Rajghat (serial nos. 10 and 11), Sonepur (serial no. 13), Taxila (serial no. 15) and Prakash (serial no. 18) contain more than 5% of tin-alloying and hence according to Coghlan these should be placed in the category of bronzes. (This may also indicate the exploitation of local ores of tin).

(2) Objects at serial nos. 16 and 19 from Taxila and Prakash have zinc 34.34% and 17.75% respectively. This is an evidence of copper-zinc alloying and shows that brass was made around Late Phase of NBP.

(3) Antimony rod examined from the Late Phase of NBP at Prakash does not contain antimony but is pure copper.

All these evidences show that the copper metallurgy of the PGW, pre-NBP and Early NBP Phases show resemblance in their chemical content. This had made some headway around the Late Phase of NBP by use of tin and zinc alloying to improve its casting properties and also its hardness and strength. The use of bronze and brass is also attested during this phase. Yet the genesis and development of the copper metallurgy from the Early Phase of Iron Age to the Late Phase of Iron Age in the Ganga Plains appears to be a continuous process. Presence of sulphur, nickle and cobalt along with iron as impurities in the objects examined from these deposits indicate that chalco-pyrite ore was smelted for obtaining the copper.

Ore-analysis :

The relative probabilities for the use of different types of ores used in the PGW and NBP Periods can be determined only if we have sufficient chemical data on ore-samples from mining areas. Not a single analysis is available from the PGW and Early Phase of NBP levels. However, the percentage composition of copper slag found from the Late Phase of NBP at Rajghat may help to know something about the nature of the ores used during this period.

TABLE—3

Percentage composition of Copper slag from the Late Phase of NBP of Rajghat (Varanasi)

SiO_2	Al_2O_3	Fe_2O_3	CuO	CaO	MgO	SO_3	Ni	Total
39.17	12.02	38.72	1.05	5.39	0.62	1.20	tr.	98.17

The above analysis shows that Rajghat slag consists of iron silicates in which smaller amount of basic oxides, e.g. CaO, Al_2O_3 and MgO are dissolved. The presence of 5.39% calcium oxide in the slag may indicate the deliberate use of lime as flux[1]. The other oxides (Fe_2O_3, Sio_2, Al_2O_3 and MgO) are usually present in the melting charge. 1.05 per cent CuO in the slag may be indicative of the fact that rich ores of copper were used.

The presence of CaO and MgO from all the analyzed copper objects (except coin at serial no. 1) belonging to the Early and Late Phases of NBP at Rajghat show that the slag (which also contains CaO+MgO) was not completely separated from the metal. The presence of lime (CaO) up to 5.39% in the slag may indicate its use as flux[2]. Since use of lime as a flux is not reported from the Harappan and chalcolithic levels, H.C. Bhardwaj thinks that use of lime was an innovation of this period.

Copper Metallurgy of Iron Age vis-a-vis Early Indian Metallurgy :

After having seen the copper metallurgy of the PGW, the Early and Late Phases of NBP, let us see whether it has any resemblance and continuity from the preceding cultures. In India, stone age cultures are succeeded by Copper-Bronze Age. Metals make their first appearance in the pre-Harappan context.

(A) From this level only two analysis are available. Mundigak (Afghanistan) copper has 98.79% copper, 1.06% tin and 0.15% iron. Nal (Baluchistan) object shows 93.02% copper, 2.14% lead and 4.9% nickel. It is clear from this that Mundigak had low tin while Nal does not show any tin but lead therein is 2.14%.

(B) The chemical analysis of the Harappa Period reveals the following groups :

a) Crude copper with about 4% impurities, e. g. As, Sb, Pb. Fe, Ni and 0.

b) Pure unalloyed copper with 98.50% copper.

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[1] H. C. Bhardwaj, *Aspects of Ancient Indian Technology*, (Delhi, 1979), p. 93.

[2] Hedge's analysis of slag from chalcolithic site of Ahar indicate that it has no lime. The percentage of So_3 (4.15%) and mgO (3.02%) in Ahar slag is much more than Rajghat slag. Mn0 is totally absent at Rajghat. Hedge feels that silica might have been added in the Ahar specimen as a flux. Thus we find that Ahar and Rajghat slag specimens differ. The details of Ahar slag analysis could be seen in K. T. M. Hedge, unpublished Ph. D. thesis or D. P. Agrawal, *Op. cit.*, (1971), p. 158, quoting Hegde's analysis of slag from Ahar.

c) Bronzes with variable tin content ranging from 2—26%.

d) Arsenical copper which arsenic varies from 2—26%.

e) Copper-nickel alloy in which nickel content goes up to 9.38%.

f) Copper-lead-tin bronzes in which in addition to copper and Sn, Pb is up to 14.9%.

This shows that Harappans used deliberate arsenic, lead and tin alloying.

(C) Copper Hoards also show abundant supply of metal and their chemical composition reveals :

a) Un-alloyed copper (as reported by Lal and D. P. Agrawal).

b) Tin alloying in a number of objects as reported by Smith.

Hence if we accept the view of Lal and Agrawal, the Copper Hoard people did not know alloying and their metal was of pure copper only. But V. A. Smith, however, found tin alloying in a number of objects.

(D) In the copper artifacts from the chalcolithic site[1] of Jorwe, Chandoli, Nevasa, Navdatoli, Somnath and Ahar we get the following :

a) Unalloyed copper from Jorwe (99% Cu).

b) No aresenic alloying is indicated. But low tin (1.5%) and low lead (1.2%) alloying is seen in Malwa and Jorwe cultures. Tin is significant by its absence in the Ahar objects. The Banasians were adding lead only.

c) Rare alloying of tin in the optimum range of 8—12% at Somnath.

Thus there is no resemblance in the technologies of the chalcolithic cultures with the Harappans and the Copper Hoard people as betrayed by different alloying pattern. In metal repertoire, these post-Harappan chalcolithic cultures are also poorer in comparison with Harappans and Copper Hoards.

(E) Copper objects from the PGW, pre-NBP levels and Early Phase of NBP give evidence of unalloyed copper ranging in content from 95.45% to 98.43% with impurities of Tin, Lead, Arsenic, Iron, Nickel and Zinc.

(F) In the Late Phase of NBP alloying was well known. Objects from Rajghat, Sonepur, Taxila and Prakash contain more than 5% of tin-alloying and hence can be placed in the category of bronzes. Copper-Zinc alloying from Taxila and Prakash shows that brass was also made during this period.

The result of the analyses of these cultures of the Early and Late Phases of Iron Age (E and F) hardly show any technological similarities with the preceding cultures (at A, B, C and D). The copper metallurgy of the Iron Age do not exhibit any affinity with these non-Iron Age cultures. However we do find some sort of development from the Early Phase of Iron Age to the Late Phase of Iron Age. As said earlier, the copper metallurgy of the

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[1] See D. P. Agrawal, *op. cit.*, (1971), pp. 154-155, Table 21.

Late Phase of NBP or Late Phase of Iron Age did made some headway by the use of tin and zinc alloying to improve its casting, hardness and strength properties. The use of bronze and brass is also attested during this phase. Under the circumstances there is every likelihood of the Iron Age copper technology to have grown individually or we have to find out its forerunner within the Ganga Plains itself. To answer this we may have to look for copper mines and the particular ore which might have been exploited by the people of the Iron Age.

Location of Copper mines and Ore-correlation :

Copper is widely distributed in soil, waters and ores. Nature copper is found on the surface layers of copper and iron ores. The main Indian copper minerals are Chalcocite (79.8% copper), Covellite (66.5 Cu), Malachite (57.3% Cu), Bornite (55.5 Cu), Azurite 55.1% Cu), Tetrahedrite (52.1% Cu) and Chalcopyrite (34.6% Cu). The flourishing copper mining areas are mainly located in Rajasthan, Bihar, Andhra and Kumaon (U.P.)[1]. We wlll give below some of the main occurrences of copper ores in Bihar, as this area is more important fot the period (Iron Age) and the region (Ganga Plains) which we are discussing at present. The details are based on some works[2].

(1) District Singhbhum

(a) Mosabani : It is among the largest mining centre for copper in old days. Veins are mainly formed of chalcopyrite. Copper ores have high nickel content.

(b) Rakha : Old workings extend down to more than 50 metres. Some chalcopyrite, pyrite, chalcocite along with some oxidized ore and native copper were met at about 48 metres down.

(c) Surda : Ancient workings in this area is found over a length of 600 metres. The mineralisation of quartz-chlorite, muscovite schist occur here.

(d) Laukesera : A persistent line of old workings.

(e) Dhobani : Some of the old workings here measure up to 30 metres in width and up to 12 metres in depth.

(f) Roam : Chalcopyrite vein here contains 11.69% copper, Encrustration of malachite is also seen.

(g) Kendadih : A number of small workings is seen.

(h) Puranapani : A few old workings.

(i) Ramchandra : The main mineralized zone is 15 m wide.

(j) Rajadah : A chlorite-schist is mineralized in a zone of about 3 to 4.5 m wide and extends to about 800 to 1000 metres.

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[1] J.A. Dunn, *Bulletin of the Geological Survey of India*, no. 23, (Delhi, 1965).

[2] *Ibid.*, pp. 75-90; *A Plan for Davelopment of Copper Production in India*, National mineral Development (India, 1966), pp. 77-90 and D. Kerr-Cross, 'Ancient Mines and Minerals in India', *Indian Minerals*, vol. 4, no. 1, (1950), pp. 5-10.

Table—4

Spectroscopic Examination of Copper Ores from Bihar.

S. No.	Description	Cu	Sn	Pb	As	Sb	Fe	Ni	Zn	Co	CaO	MgO	S	Ag	Au	Mo	P	Sa	Cd	Te	Bi	Ti	Ga	Ge	In	Zr	Al	Si	Cr	V	Gd	Ti	W	Mn
1.	TF-Cu-15 Singbhum Chalcopyrite	+	ND	ND	ND	ND	+	+	+	+		+		ND	ND	+	—				ND					—	+	+	ND	+	—	+	—	+
2.	Bihar Mosaboni and Rakba Copper Ore	+	—	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	—	+	+	—	—	—	—	—	+	+	—	—	—	—	—	—

Key : + = Present.
ND = Not Detected.
— = Not examined.

At Serial No. 1 : Done by D. P. Agrawal, *The Copper Bronze Age in India*, (*1971*), Table 32, p. 174.

At Serial No. 2 : Done by H. C. Bhardwaj, *Aspects of Ancient Indian Technology*, (1979), Table 28, p. 95.

(k) Bara Chakri : It has a meter thick chalcopyrite bearing zone containing up to 14.45% copper.

(l) Ram Chandra Pahar : It has extensive old workings in copper mines.

(2) District Hazaribag :

(a) Baragunda : It has extensive belt extending over a length of 1200 m. Number of slag heaps are reported. Copper in slag 0.08 to 13.04%.

(b) Geyjadih : Mineralization of the same nature as in Baragunda mines.

These facts lead us to believe that there is some evidence of ancient mining and smelting from a large number of ores which on mineralogical examination indicate the presence of chalcopyrite, chalcocite, malachite, azurite and native copper etc. among the collection of ancient workings[1].

A closer comparison of the objecrs from the PGW, pre NBP and Early NBP Phases (as shown in Table 2) and the spectroscopic analyses of Bihar ores (as shown in Table 4) shows :

(1) That there is a close correspondence between the impurity pattern of the two. Both show the presence of tin, lead, arsenic, iron, nickel and zinc.

(2) Significantly tin-alloying is noticed in the Late Phase of NBP at Rajghat, Sonepur, and Kausambi (object at serial no. 8 in Table 2). The main ore of tin is cassiterite which has been reported from several sites of Bihar (Hazaribagh, Ranchi and Gaya).

(3) The presence of iron, nickel, cobalt and sulphur (particularly from Rajghat) in the copper objects examined from the Early Phase of Iron Age (*i.e.* from PGW and Early NBP Phase) indicate the use of chalcopyrite ore of copper. Bihar sites also have chalcopyrite bearing zone.

(4) Chalcopyrite is also reported at Khetri (Rajasthan) but since these mines were too far off and the thick forest intervened in between, it cannot be a likely source. On the other hand, Bihar belt lies in close proximity from these sites.

The present evidence do indicate the possibility of Bihar ore being used by the people of the Early and Late Phases of the Iron Age of the Ganga Plains. However a much larger number of artifacts and ore analysis are required to arrive at any definite conclusion.

Technical Affinities of Iron Age Cultures with other Cultures :

The pre-Harappan copper material from Kot-Diji and Kalibangan has not been analysed. The composition of Mundigak (South Afghanistan) and Nal (Baluchistan) material does not show any affinity with the Harappan copper. Harappans on the other hand had plenty of copper objects and they were masters of metal forging technique. They used deliberate arsenic, lead and tin alloying. In metal-repertoire, the post-Harappan chalcolithic cultures were poorer in comparison with Harappan but richer than the Neolithic cultures. The Banasians were adding lead only but the Malwa and Jorwe cultures used lead and tin as alloys. The Copper Hoard people had a well developed tool technology and abundant of copper. B.B. Lal got the Bisauli anthropomorph examined and found that it contains pure copper[1]. D.P. Agrawal and others analysed five Copper Hoard specimens from Shahbad, Kamdara, Dhanbad and Dargoma and found that they also do not contain any alloy[2]. Specimens of copper analysis from the Early Iron Age (PGW and Early NBP) are also devoid of any alloys. Does this mean any affinity or contact between the two ?

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[1] V. Ball, On the Ancient Copper Mines of Singhbhum, *Proceeding Asiatic Society Bengal*, (1969), pp. 170-175.

Considering archaeological evidence, Deshpande feels that OCP (normally being associated with Copper Hoards) should have some impact on the PGW culture because both are partly contemporary, cover more or less the same region and show some similarity between the red ware which occurs in association with OCP and PGW[3]. H.C. Bhardwaj thinks that the Copper Hoard people started mining and smelting around 1100 B.C. in Bihar and subsequent cultures in the east including those at Sonepur, Chirand and Rajghat were obtaining their copper ores from the same area[4]. It may be pointed out if one is at all keen to know the impact of pre-Iron Age cultures upon the Iron Age culture, such sites should be chosen which may show a cultural continuity. Since OCP are single culture sites, they are mostly deserted by a people who occupied it. Secondly, in the Ganga Plains there is a chalcolithic deposit which intervenes in between the OCP and the Early Iron Age or PGW or Early NBP. The comparison made by any body, if any, may therefore be misleading. Instead, it is better if one proceed to compare the cultural equipments of the chalcolithic culture of the Ganga Plains with the PGW and Early NBP deposits of the Early Iron Age because there is no cultural or stratigraphical gap between the two. Almost in the whole of Ganga Plains there is one striking phenomenon *viz.* the preceding chalcolithic culture significantly continue to exist in the succeeding PGW and Early NBP Phases even after the introduction of iron. The chalcolithic culture of the Ganga Plains is relatively less prolific in the yield of copper. The purpose here is not to give an exhaustive catalogue of artifacts, but to note the important ones only. For example, Mahisdai yielded a copper axe of flat socketless type; fish-hooks from Pandu Rajar Dhibi and Oruip; copper rings from Atranjikhera, Pandu Rajar Dhibi and Koldihwa; bangles from Oruip, Pandu Rajar Dhibi and Chirand; copper wires for making rings from Sonepur and Chirand and a few unique specimens for personal decoration *i.e.* eye-pencils from Pandu Rajar Dhibi. By far the

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1. *Ancient India*, no. 7, p. 20.
2. D.P. Agrawal, *op. cit.*, (1971), p. 171.
3. M.N. Deshpande in *Indian Pre-History*, (Poona, 1965), p. 129.
4. H.C. Bhardwaj, *Aspects of Ancient Indian Technology*, (Delhi; 1979), pp. 98, 102 and 106.

largest number of copper objects has been reported from Koldihwa. These include knife, spear-heads and ornaments like ring, bangles, beads and pendants. The metal repetoire of the Early Phase of Iron Age, viz. PGW and Early NBP cultures (as given in the beginning of the chapter) show striking resemblance with this chalcolithic culture. Unfortunately none of the artifacts from this level has been chemically, metallographically and spectrographically analysed. However, on purely archaeological grounds as indicated above, abundance of metal in both and on the basis of the compatibility in the nature of objects, some sort of affinity between the chalcolithic culture and the Early Iron Age cultures of the Ganga Plains may be indicated. But for any valid conclusion more data are required.

D. IRON TECHNOLOGY

From the above discussion it is clear that iron could not for long replace copper or bronze in India. The Harappans, the Banasians and the Copper Hoard people were well versed in copper-bronze technology. They had also plenty of iron ores around them and the metal would have met nearly all their requirements. We have already seen (*Supra*) that the finished iron objects are found from the very beginning of the PGW and Early NBP Phases and iron becomes much more prolific and diverse in use during the Late Phase of NBP. Inspite of some diversities among these phases of the Iron Age, there is considerable similarity among the iron objects of all these phases. We will now examine whether the iron technology was imported or these iron foci learnt it independently or through diffusion from some other place of the country. For it is now clear that mere acquaintance with the use of man made iron was not enough to place these phases within the usher of the Iron Age of India.

This problem is beset with a difficulty because the data on technological processes are sadly lacking. So far none of the iron objects from the PGW phase has been chemically analysed. However, the most important evidence of the smelting and forging of iron objects comes from the earliest phase of the PGW at Jodhpura. The two furnaces (one was to extract the bloom and the other for heating during forging), a stone platform and big lump of haematite ore found at the site indicate an advance stage of iron metallurgy. According to M.D.N. Sahi, 'A preliminary examination of the available evidence shows that Jodhpura iron smelters exploited local ore and the fuel resources. Most probably they extracted the metal directly in a primitive furnace without fluxing the ore[1]. Out of the seven objects of Prakash analysed[2] by V.T. Athavale, only three come within the purview of the period of our study. Object number 10 is from the strata of comparable period of the Early Phase of Iron Age while object numbers 13 and 14 are from the Late Phase of NBP. Hence the chemical analysis of only these three iron objects are given below in Table 5.

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1. M.D.N. Sahi, 'Comparative Chronology of Early Iron Age Cultures in India (A Study of the role of Iron in Socio-Economic Change'), Unpublished Ph. D. Thesis, Aligarh, 1979, p. 116.
2. V.T. Athavale, Chemical and Metallographic Examination of Metal Objects, *Ancient India*, nos. 20 & 21, pp. 135-139.

Table—5

Chemical Analysis of Iron Objects From Prakash

		From the Early Phase of Iron Age	From the Late Phase of NBP or Late Phase of Iron Age	
Constituents	Lab. Number Object Number and its name	1796 10 Objects of indeterminate use	1799 13 Celt like axe-head	1800 14 Celt-like axe-head
		%	%	%
Silica (SiO_2)		4.80	1.08	0.79
Total iron expressed as ferric oxide (Fe_2O_3)		84.71	92.66	94.55
Alumina (Al_2O_3)		0.97	1.40	0.32
Titania (TiO_2)		Trace	Trace	Trace
Lime (BaO)		0.35	0.81	0.47
Magnesia (MgO)		0.42	0.38	0.20
Manganese, nickel and chromium compounds		Trace	Trace	Trace
Phosphorus pentoxide (P_2O_5)		0.42	0.38	0.27
Sulphates (SO_4)		0.32	0.19	0.23
	Total	91.99	96.90	96.83
Ferrous Oxide (FeO)		8.68	13.61	8.35
Loss on heating at 300°C (combined and free water)		6.50	3.93	5.01
Loss on ignition at 1000°C (including loss at 400°C)		6.93	3.77	5.17
*Carbon		0.43	0.56	0.48

The above analysis shown in Table 5 reveals the following :

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* The presence of carbon in the sample may be due to the presence of small amounts of carbonates, or may have been derived from the residual shellac binder.

1. The metal is pure and it becomes still purer in the Late Phase of NBP.

2. The presence of metallic iron in the specimens was vaguely indicated. Wrought iron was used in general.

3. The presence of carbon content in the samples, a little over 0.35% was due to small amounts of carbonates or may have been derived from the residual shellac binder. The samples, therefore, do not qualify as modern steel.

4. The chemical and metallographic analysis of object number 30 (not shown in the above table), an shaft hole axe, assignable to about 200 B.C. (Period III of Prakash), does show the presence of pearlite at the grain-boundaries.

H.C. Bhardwaj has analysed a few iron slags and six iron objects from the Early Phase of NBP of Rajghat. His findings are similar with the above Prakash objects found in the strata of comparable period. His analysis also shows that the metal was pure and the majority of objects have carbon content of about 0.2% and hence they do not qualify as modern steel. From the composition of the slag it appears no flux was used. Rajghat iron had impurities of Ti, Ni, Cu, P_2O_5 and S which shows that titaniferous ores with apatite complex might have been used. Such ores are found in large number in Singhbhum and Mayurbhanj. Hence he feels that Rajghat iron might have been obtained from Bihar[1].

In the Late Phase of NBP, by far the best evidence of smelting and manufacture of iron objects is provided at Ujjain. The evidence is in the form of iron slag, iron ore, lumps of calcite or aragonite and lime. The whitish powder (presumably lime), in all probability, represented calcium compounds which acted as a flux and was the result of smelting operation. Broad inferences drawn by N.R. Banerjee about the actual mode of smelting and forging are as follows :

"As regards the actual mode of smelting, the evidence is not clear, though certain broad inferences are possible. Alternate deposits of charcoal mixed with the iron slag and a whitish powder, possibly lime, as stated above, occurring in an exposed section point to a simple method of smelting employed at Ujjain. The *modus operandi* consisted, inferably, in laying several alternate courses of charcoal and iron ore and covering the entire pile thickly with clay to prevent the heat from escaping. The sides of this heaped and simple kiln, which should have been circular in plan, must also have been provided with passages for the intake of air and escape of gases, and outlets for molten iron. The molten liquid, after collection, was, no doubt, first cooled by dipping into water and then beaten with hammer to drive out the charcoal, which, in the course of the hammering went into the (reduced) iron, giving it, to an extent, the properties of steel, and thus eliminating the slag. While the evidence at Ujjain on the process of smelting is inconclusive as to the actual methods employed, it is nevertheless, clear that charcoal was used as fuel, the hearths were of the 'open' type, and the iron smelters had reached the technical advancement requiring the use of a calcium flux to aid them in smelting. Such a stage of development would itself be the result of prolonged experimentation involving much trial and error, and would indicate a still earlier beginning for the iron working in the area, which quite fits in with the evidence. The primitive form of the kiln in combination with the evidence of a flux would perhaps suggest a local development.

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[1] H.C. Bhardwaj, *Aspects of Ancient Indian Technology*, (Delhi, 1979), p. 156 and 173.

As regards the method of forging adopted in the period range of *circa* 500-200 B.C., the remains of a forge with a groove for the introduction of the working end (or nozzle) of blower or bellows, an improvised stand made from the sturdy and large neck of a broken vessel to support a water jar to store water for quenching, a small or miniature jar to collect small quantities of water according to necessity, and a shallow but large enough bowl to contain water near at hand for quenching help to reconstruct the process of a blacksmith's working. The use of an anvil also of iron and iron tools like pincers for handling the red-hot iron bar or tool, is clearly indicated. The iron nail and chisel lying near the forge, which is lined with bricks and clay, burnt hard, and contains ash and charcoal, suggest the variety of objects produced, sharpened or remade at the forge. This method is even now in vogue and would by itself indicate an advanced stage of development of the process of iron working, with a long background[1]".

In this phase also an iron smelting factory existed at Saradkel, a site situated 50 km from Ranchi and attributed by tradition to the Asuras. The evidence is in the form of number of pits (used as furnaces), charcoal, iron slag, heamatite ore, sand and a stone anvil which might have been used for beating slags[2]. The excavations at Dhatwa in Surat District revealed evidence of iron metallurgy in the form of iron objects, lump of iron slag and chunks of ore (haematite and limonite) from the early historical level at the site. Slag samples indicated that much of the iron in the ore was lost in the slag and such a slag results from smelting the ore at low temperature of about 1100°C to 1200°C. The metal extracted was pure (99.76%). The hard implement like hoe was produced in two stages. First, the red hot bloom was forged into thin sheets on an anvil near and open hearth. In this process the surface of the sheet was carburized and case hardened. Secondly, a number of these sheets were joined laterally, one by one, by forging welding. Finally, the whole mass was further forged to shape it into a hoe[3].

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1. N.R. Banerjee, *The Iron Age in India*, (Delhi, 1965), pp. 178-179.
2. *Indian Archaeology*, 1964-65, *A Review*, (1969), p. 6.
3. K.T.M. Hegde, 'Early stages of Metallurgy in India', *Radiocarbon and Indian Archaeology*, (Bombay, 1973), pp. 401-405.

Observations :

1. In the PGW phase there are evidence of the smelting and forging of iron objects as known from Jodhpura. But the evidence is limited.

2. Limited chemical analysis from comparable strata of Prakash and from the Early Phase of NBP of Rajghat indicate that metal extracted was remarkably pure. The bloom must have been more pure and comparable to the present day wrought iron. Iron objects, from these Early Phase of Iron Age, due to less carbon content, do not qualify as modern steel. The composition of the slag indicate that no flux was used.

3. We have more and better evidence of smelting and forging of iron objects in the Late Phase of NBP or the Late Phase of Iron Age. In this phase, the metal becomes still purer as evidenced from Prakash and Dhatva samples. The use of calcium compounds as a flux in the smelting of iron is evidenced only during this phase. Although the wrought iron was in use from the Early Phase of Iron age but it could not get the real breakthrough unless the process of carbonization and steel making could be worked out in the Late Phase of NBP or the Late Phase of Iron Age[1].

4. The material climate of the Ganga Plains was receptive to the introduction of iron technology. For almost on the whole of Ganga Plains there is a basal matrix, afflicted in differing degree, of the chalcolithic culture. This is peacefully intruded by iron using PGW people on the west and NBP using on the east which certainly deluge the area with more metals. The chalcolithic people had a knowledge of copper metallurgy. The Bihar and the Vindhyan region possessed iron ores in abundance. We are here actually witnessing a transformation of a chalcolithic society into a sophisticated semi-urban Iron Age community groups. With this situation, suitable area and climate, these Iron Age communities had the best scope for profitting from the copper technology of the chalcolithic people.

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[1] An iron axe from Mahurjhari (District Nagpur), a Megalithic site contains 0.9% carbon and hence reported to be made of steel. See, S.B. Deo, *Mahurjhari Excavation*, 1970-72, (Nagpur, 1973), p. 61 and 77. Similarly an iron spear from a Megalithic site, Khapa (in Vidarbha of Maharashtra), dated from *circa* 7th-8th century B.C. to *circa* 4th century B.C., contains 99.6% of iron. According to K.N. Munshi and R.Sarain, who analysed it, the spear may be a variety of steel, See, S.B. Deo, *Excavations at Takalghat and Khapa*, (Nagpur, 1970), p. 14 and 79.

2. THE CERAMICS

A. THE POTTERY COMPLEX OF THE PAINTED GREY WARE CULTURE

Painted Grey Ware :

Fabric A :

Under this fabric we have placed those PGW sherds which come under the standard definition of PGW as given by Lal and Thapar. This distinctive pottery is made of fine levigated clay, well fired, wheel turned, thin and grey in section and grey to greyish brown in surface colour. On the grey surface are painted geometric, foral and individualistic designs in matt black colour. The greater part of this decoration is external but in the case of dishes and wide mouthed bowls, the inner surface was also decorated with elaborate patterns. Noteworthy painted designs include the simple horizontal band around the rim (commonest pattern), groups of verticals or oblique strokes, dotted patterns, criss-cross lines, chain of spirals, concentric circles or semi-circles, *sigmas*, *svastika*, scalloped pattern, rows of circular wavy lines, rows of chains bordering a circle, leaf filled with parallel hatching (Khalaua), hooks and intersecting semi-circle or a group of intersecting 'U's etc. It is noteworthy that designs are not standardized and in most cases they are so carelessly and haphazardly executed that it is difficult to make out any set pattern out of it. At Hastinapura, however, the simplest and the commonest design is the group of roughly vertical strokes very often found both inside and outside below a horizontal rim-band. Bowls and dishes are the common shapes. Heavier shapes are completely absent.

In India this fabric is reported from northern and eastern Rajasthan, Punjab, Haryana, Madhya Pradesh (e.g. Besnagar. Barata and Kutwar etc.), western U.P., eastern U.P. (e.g. Sringverapura) and north Bihar (e.g. Vaisali). Recent discovery of this ware at Thapli in the Himalayan region of Garhwal has proved that it did penetrate the mountain region[1]. In Pakistan it has been found at Harappa in Punjab, Lakhiyo Pir in Sind and in the erstwhile Bahawalpur State. In Nepal, it is reported at Banjarahi and Tilaurakot. But it must be noted that except a few sites almost all these regions have produced this standard variety of PGW wholly insignificant in number and quantity. It was a prized commodity and hence its provenance in a particular strata may not always denote its true cultural context. The cultural context of this ware established at Hastinapura (where it is found to occur throughout the occupational deposit of Period II dated from *circa* 1100 to *circa* 800 B.C.) in the Upper Ganga Plain may not be representative for all other regions which have also yielded this standard PGW. Even at Hastinapura which has a sizable deposit of PGW culture and was excavated extensively for two season's all the available sherds of this fabric included in the drawn specimens are only 58 in number[1]. At Atranjikhera its incidence ranges between 3% to 10% of the total pottery. Though no statistical account is available from other sites, from all other indications, the percentage of the ware at Mathura[2], Ahichchhatra, Khalaua, Jakhera, Allahapur, Kesari, Alamgirpur, Batesvara. Hulas and Pariar seems to be far below than that of even Hastinapura and Atranjikhera. Single sherd of PGW has been reported at Kanauj while Sravasti yielded only five or six specimens. The situation at Kausambi, Sringverapura and Vaisali is similar. If our observation at Kampil is any guide, the PGW was completely absent at this single culture PGW site[3].

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[1] K.P. Nautiyal, et al., 'Thapli : A PGW Site in Garhwal', *Puratattva*, no. 10, 1978-79, (New Delhi, 1981), p. 94.

Outside the Upper Ganga Plain, this PGW is also found in restricted number. According to A. Ghosh who explored large number of PGW sites in the dried up river beds of Sarasvati and Drisadvati, 'the vessels in grey ware are restricted in shape, being confined to dishes and bowls. The painted designs also present a limited variety'. The site of Ropar where it is found stratified above a post-Harappan occupation has produced about half a dozen pieces[4]. Ujjain, Besnagar, Barata in Madhya Pradesh also yielded this ware in restricted number. At Thapli the frequency of the PGW with 120 sherds is 10% of the total yield of pottery. On the other hand there are several sites where PGW is completely absent yet on the basis of other materials one is tempted to associate the deposit with the PGW culture. The logical proposition of this phenomenon is that this sophisticated ware is found to occur in differing context and hence it is not safe to use it as a cultural label at every site wherever it is found. The cultural context of the PGW at Hastinapura may not be representative for all other regions which have also yielded PGW.

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[1] *Ancient India*, nos. 10 and 11, pp. 34.44. Out of 58 specimens of PGW, 17 are from an early level of the PGW deposit (Period II), 11 from mid-level, 13 from late level, 13 are unstratified, 3 from an accumulation following the erosion and 1 is unlabelled.

[2] PGW at Mathura could be found only at one site at Ambarish Tila (MTR-8).

[3] Our own observation at the site which was extensively excavated for one season.

[4] D.H. Gordon, *The Prehistoric Background oj Indian Culture*, (Bombay, 1960), p. 141.

Fabric B :

We have another group of painted grey ware in which the core is grey and the section is thin as that of the above standard PGW (Fabric A). Ten such sherds are illustrated at Hastinapura in which the painted designs has been picked out in ash-grey by 'stopping' the rest of the body of the pot with a thin dark slip. Although the method of painting differs from that of Fabric A, but there is complete harmony in the details of the painted designs. Out of the ten specimens illustrated at Hastinapura the majority are from an early level[1] of the PGW deposit. A similar sherd of a grey ware, in which a design of oblique strokes has been picked out in ash-grey by 'stopping' the remaining body with a dark black slip, has been found in the level assignable to *circa* 800 B.C. (i. e. from an early level of Sub-period IA or pre-NBP phase) at Prahladpur[2]. In the corresponding strata of comparable age (i. e. in pre-NBP deposit) at Gularihavaghat in Basti, exactly similar specimens are found in large numbers[3]. Recenty in April, 1982, the author at the site of excavation noticed exactly similar sherds from the pre-NBP levels of Khairadih in District Ballia, a site which is being excavated by the Banaras Hindu University since 1981.

Fabric C :

Another group of sherds consists of red or brownish red wares in which the designs are also painted in black on a red or pale-red surface. Its core is grey or buff and the section is thin. Painted designs which normally consist of oblique strokes coming out from a horizontal rim-band, resemble fully with the designs on the standard or top-graded PGW (Fabric A). This group is also associated and coeval with the PGW at Hastinapura. The colour of the pottery only differs. However in this group several other colour variations whether intentional or accidental are also met with. Only seven sherds of this group are illustrated at Hastinapura and it is noteworthy that out of these, 5 come from an early levels of the PGW deposit[4]. But at Ahichchhatra and Jakhera, in the corresponding level, these are reported in large quantity. But at Jakhera it precedes the standard PGW stratigraphically

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1. *Ancient India*, nos. 10 and 11, pp. 34-44, Types 9, 18, 21, 31, 33, 40 (?), 63, 66, 67 and 73. Out of these 7 are from an early level (Types 18, 21, 31, 33, 63 and 66), 1 from mid-level (Type 9) and 3 from an accumulation following the erosion (Types 70 (?), 63 and 73).

2. *The Excavations at Prahladpur*, (Varanasi, 1968), p. 18 and 69, Figure 15, Type 3A.

3. Our own observation at the site and the excavated material brought by a team of the Banaras Hindu University.

4. *Ancient India*, nos. 10 and 11, p. 38, Types 20, 25, 26, 28 and 29 are from an early phase, Type 23 from the mid-level and Type 22 is from the unstratified deposit of Period II.

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and also overlaps[1] with it. Similar painted pottery has been also noticed in the strata of comparable age of Koldihwa.

Fabric D :

Yet another class of the painted grey ware consists of grey ware of similar fabric as that of the standard or top-graded PGW (Fabric A) on which the designs are not painted but stamped. These are very rare. A single specimen[2] with a stamped design of rows of punched circles is to be found at Hastinapura. Similar specimen[3] has been also reported from Atranjikhera.

Obviously we cannot remove these varieties *i.e.* Fabrics B, C and D from the fold of the PGW. The concept of standard PGW should, therefore, be now revised[4]. It is not a single homogeneous type of ware produced out of a single technique.

The Associated Wares of the PGW :

The entire range of the associated wares of the PGW comprises four main ceramic industries; (1) the plain grey ware, (2) the black slipped ware (3) the black-and-red ware and (4) the red ware.

Plain Grey Ware :

A close examination of the Hastinapura pottery assemblage shows that all the plain grey wares are not similar in form and fabric with the PGW as said by some scholars. Plain grey ware of fine fabric with forms like bowls and dishes are similar to the PGW except that they are devoid of any paintings. Besides bowls and dishes close to the PGW type, we have also other shapes like vases (HST., Figure 11, Types 111 and XiXa; Figure 13, Types XLI, XLII and XLIII), basin (HST., Fig. 13, Type XXXVIII); deep bowls (HST., Fig. 13 TXL), and a stem of a base with corrugated profile (HST., Fig, 13, Type XLV). In these shapes the fabric is also generally not so fine as that of the standard PGW.

In the Upper Ganga Plain, the ware is reported from Hastinapura, Atranjikhera, Jakhera, Hulas, Allahapur and Alamgirpur along with the PGW. At sites like Kampil, Khalaua and Sravasti, where PGW occurs in a very restricted number the frequency of the

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1. Information kindly given by M.D.N. Sahi, the excavator of this site.
2. *Ancient India*, nos. 10 and 11, p. 40, Fig. 9, Type 45.
3. R.C. Gaur in *Potteries in Ancient India*, (Patna, 1969), p. 186.
4. T.N. Roy, 'The Concept, provenance and chronology of the Painted Grey Ware', a paper accepted for publication in *East and West*, (Rome, 1982).

plain variety is also less. Outside the compact zone of the PGW *i.e.* on sites of eastern U.P., Bihar and Bengal either it is entirely absent or occurs only occasionally (*e.g.* at Prahladpur and Rajghat). It is more at home on sites of Punjab, Haryana and Bikaner sub-division of Rajasthan. Thus two strains could be seen in this.

(*a*) On the Ganga Plains the ware in form and fabric is more close to the PGW. Its number is also restricted along with the PGW which itself does not occur in a fairly good number. Its largest concentration has been reported by B.B. Lal and A. Ghosh on the sites of the Upper Ganga, Sutlej and Ghaggar basins. Here it varies from fine to coarse texture.

(*b*) Decorations, both stamped and incised is a frequent feature of Bikaner division of Rajasthan. Examples of spiralled decoration all over the body of storage vessels of medium to coarse fabric has been found at Chak 86, Chak 72 and Sardargarh. Several incised designs are also seen on the plain grey ware of this region.

(*c*j Vases, storage jars and lid-cum-bowl are more common on these sites and their shapes also differ. Besides these, certain unusual shapes also occur outside the Ganga Plains.

Black Slipped Ware :

This is by far the most important and basic representative pottery of the whole Ganga Plains. This ware is turned on a fast wheel, core usually black but also some times greyish black and is treated with a smooth black slip. A fairly good amount of sherds are burnished. B.B. Lal and B.K. Thapar were the first archaeologists who discovered specimens of black slipped ware or black polished ware from the PGW levels of Hastinapura. They did not take any particular notice of the ware and regarded it as the immediate precursor of the NBP, though they could not have failed to notice its occurrence considerably below the so called NBP levels at Hastinapura (for there was a time-gap between the PGW and NBP Periods). A possible explanation for this may be that they laid much emphasis on the occurrence of PGW and NBP specimens only. When we excavated Prahladpur in 1963, we did not fail to notice that the black slipped ware associated with the PGW phase of Hastinapura is similar in technique, texture and typology with the black slipped ware found in the pre-NBP levels of Prahladpur, where it has been dated to *circa* 800 B.C. The same sequence was observed by us at Rajghat which too was being simultaneously excavated. At Prahladpur, of course, the black slipped ware was observed in a comparatively more precise datable context, having considerably preceding the earliest occurrence of NBP in a well stratified deposit. The position briefly is as follows :

In Sub-period IA (dated[1] from *C.* 800 B.C. to 600 B.C.), which is pre-NBP habitation, black slipped ware occurs in prolific number and diverse shapes. It is maintained throughout the occupation levels of Sub-periods IA and IB which represents nearly 3.06 m thick deposit. A special feature of this pottery in the region is the paintings which are more akin to those on the PGW[1]. Plain grey ware, though, extremely rare, undoubtedly belong to the same category as the plain grey ware specimens from Hastinapura. The red ware shapes associated with the pre-NBP deposit at Prahladpur also have many common types with the PGW phase of Hastinapura. What is extremely important that our observation of 1964-65 revealed that typologically two trends could be distinguishable in this ware-one resembling certain chalcolithic forms and another resembling typical PGW and Early NBP forms[2]. In fact the wide differences between black slipped ware and NBP as pointed out in the Hastinapura Excavation Report may be true only when we compare these sherds with the standard variety of NBP (top-graded NBP). We have now several other varieties of NBP. It is noteworthy that now specimens of black slipped ware reaching very close to the NBP have been found at Jakhera, Atranjikhera, Sravasti, Kausambi, Prahladpur, Rajghat and the recently excavated site of Khairadih in District Ballia of U. P. (This site is being excavated by the Banaras Hindu University from 1981).

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[1] On the basis of TF. 186, which reads 765 B.C., the beginning of this phase and consequently that of the black slipped ware deposit is indicated to *circa* 8th century B.C. at the site.

Eversince our article highlighting the importance of this pottery appeared in 1964-65, the ware has since been unearthed from a large number of recently excavated sites. We shall examine the available evidence regarding the provenance and chronology of the ware in the light of some of the opinions already expressed by us on the subject.

The distribution of this ware is more extensive than that of PGW. The main regions of this ware are : the Upper Ganga Plain (incorporating within its bounds the Divisions of Meerut, Agra, Rohilkhand, Lucknow, Faizabad and Allahabad), the Middle Ganga Plain (it covers the eastern Uttar Pradesh (mostly Purbia Plain) and Bihar Plain) and the Lower Ganga Plain (covers the whole of West Bengal). Its compact zone seems to be the Middle Ganga Plain *i. e.* eastern U.P. and Bihar but in small quantity it has been also reported by Deshpande and Dikshit in the upper reaches of the Ganga-Yamuna Doab, Saraswati and Sutlej either in association with the PGW or black-and-red ware or both[3]. It may be noted that the occurrence of this ware has been reported from the following different stratigraphical contexts :

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1. Painting consist of a group of wavy lines of unequal thickness picked out in ash-grey by stopping the remaining body with a thin dark slip. Such type of painting has been also reported in the grey ware sherds of Hastinapura, Period II. See A.K. Narain and T.N. Roy, *The Excavations at Prahladpur,* 1963, (Varanasi, 1968), p. 69.
2. For details see T.N. Roy, 'Stratigraphical Position of the PGW in the Gangetic Valley', *Bharati, Bulletin of the College of Indology,* no. 8, Part II, (Varanasi, 1964-65), p. 72 and 76. Also quoted in Vibha Tripathi, '*The PGW—An Iron Age Culture of Northern India*', (Delhi, 1976), p. 92.
3. M.N. Deshpande, 'PGW in Ganga Valley', a paper read on 18th August, 1968 at the seminar on archaeology, Aligarh Muslim University.

(1) From pre-PGW Context :

In the Upper Ganga Plain[1], the earliest occurrence of the ware has been reported in the pre-PGW horizon at Atranjikhera, Jakhera, Pariar, Kausambi and Sringverapura. Corroborative evidence of Prahladpur, where in fact the ware was used as a cultural label, comes from Sringverapura. Here it is found to occur throughout the occupational deposit of Period II (comprising layers 19 to 14 with an average deposit of about 1½ meter) dated from 950 B.C. to 700 B.C. The beginning of the ware at Sringverapura, on the basis of comparative stratigraphy as well as several thermoluminescence and radiocarbon dates[2] is well ascribed to *circa* 900 B.C. The initial date of *circa* 900 B.C. for this ware is corroborated from a single radiocarbon date of 1025±110 B.C. from the PGW phase of Atranjikhera. The controversy over this single date does not concern us here. The PGW occupation at this site is preceded by black slipped and black-and-red wares stratum, which by inference of the above mentioned date, would thus in no case be later than *circa* 900 B.C. It is difficult to assign any date about its end. For the ware continue to exist significantly even in the subsequent cultural period not only at Sringverapura (Sub-period IIIA, marked by the presence of Early NBP and a few sherds of PGW) but also at Atranjikhera (PGW phase), Jakhera (PGW phase) and Kausambi (Early NBP with a few sherds of PGW).

At all these sites this pottery is found associated with black-and-red ware (unpainted). In this context bowls far out number the dishes and their shapes are akin to black-and-red ware.

(2) From PGW context :

The ware continue to exist in the PGW phase from the pre-PGW horizon on sites enumerated above (Atranjikhera, Jakhera, Kausambi and Sringverapura). The ware is also invariably reported from all those sites of the Upper Ganga Plain where the occupation starts with the PGW. The sites belonging to this category are Hastinapura, Kanauj, Kampil, Khalaua, Batesvara, Mathura, Allahapur, Alamgirpur, Kesari and Hulas.

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1. In the pre-PGW context, black slipped ware has been also reported at Noh and Jodhpura in Rajasthan.
2. Sringverapura has yielded some useful information on the dating of this ware : For layer 19, the earliest deposit representing this ware, there is a radiocarbon date of 2855±200 B.P. *i.e.* 905±200 B.C., which on MASCA correction comes to 960-1010 B.C. For the next higher layer viz. 18, there are two dates : a TL date of 2743±300 B.P. and a ^{14}C date of 2700±130 B.P. These two on conversion comes to 763 B.C. and 750 B.C. respectively. For a still higher layer, *viz.* 17, there are three TL dates : 2690±280 B.P.; 2769±400 B P. and 2660±280 B.P. which on conversion comes to 710, 789 and 680.B.C. respectively.

(3) From pre-NBP context :

In this context, the ware is reported at sites of eastern U.P. and Bihar. Important sites are Prahladpur, Rajghat, Sarai-mohana, Masoan, Gularihavaghat (Basti), Sonepur, Chirand and Vaisali. A special feature of this pottery in this region is that it is painted and the paintings, although limited, are more akin to those on the PGW as stated earlier. Another distinguishing feature of these sherds is the variety of shapes found at Prahladpur which are so far not reported from any other site. Among the bowls, the shapes available are the straight sided, carinated, sub-ovaloid, hemispherical, convex sided, round sided, corrugated and stems with bases. The dishes are carinated, sub-ovaloid and convex sided. The vase is represented by only one specimen having almost a globular body and a beaded rim. All these are to be seen at Prahladpur.

In the pre-NBP-chalcolithic context, the ware is found at Koldihwa and Kakoria of this region.

(4) From Early NBP context :

The ware continue to exist significantly in the Early Phase of NBP on all the sites of this region enumerated above. Besides these it is also found at Sringverapura, Bharadvaja Asrama, Atranjikhera, Mathura, Hulaskhera and Sravasti.

(5) From Late NBP context :

In this context it is reported at Prahladpur and Rajghat but these are very insignificant in number. These may be taken as survivals.

Black-and-red Ware :

During the last three decades a group of pottery well known as the black-and-red ware has been attracting the attention of scholars. The pottery is so called, because it has a burnished black interior and black-and-red or black-and-grey exterior with the black confined to the upper part of the body of the vessel. It is found in both painted as well as plain varieties. It had a wide distribution both in time and space. In Gujarat, including Saurashtra and Kutch, the ware is reported in the corresponding strata of pre-Harappan level at Lothal[1] and Prabhas Patan (Somnath)[2]. The ware continues with the Harappan and the Lustrous Red Ware at these two sites and also at Rangpur, Rojdi and Amra.

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1. S.R. Rao, *Lothal and Indus Valley Civilization*, (Bombay, 1973), p. 54.
2. *Indian Archaeology*, 1971-72, *A Review*, (1975), p. 12.

S.R. Rao[1] believes that the ware was used by the local Micaceous Red Ware people even before the Harappans came to Gujarat, survived with the Harappans and continued to be used as late as Rangpur III where it joins hands with the Lustrous Red Ware. The ware is found with the Harappan ware of later context at Desalpur IB and Surkotada IC. The painted variety at these two sites have been equated with Ahar IB[2]. But S.R. Rao believed that black-and-red ware of Gujarat is different from Ahar region, in as much as the painting in the former are confined only to the exterior while the later has paintings on both the surfaces of the pot. Y.D. Sharma[3] also expressed a somewhat similar view. The ware is also reported from the Districts of central Saurashtra, Bhawnagar and Surendranagar. Besides the prominent sites of Ahar and Gilund, the ware has been found at about 50 sites in Rajasthan, confined to the Districts of Udaipur, Chittorgarh, Bilwara, Jaipur, Tonk and Mandasor. It has been reported in the Neolithic deposit at Koldihwa and Chirand and possibly also at Piklihal and Utnoor. In the chalcolithic context the important sites in Central India are Eran, Navdatoli, Kayatha, Manoti, Besnagar, Nevasa, Chandoli and Prakash. In the Ganga Plains it is also reported in the chalcolithic context. The important sites are Chirand, Oriup, Pandu Rajar Dhibi, Mahisdal, Haraipar, Nanur, Atranjikhera, Jodhpura, Noh, Jakhera, Pariar and Sringverapura. In the Early Iron Age it is reported from almost all the sites which have yielded PGW or NBP. In the south, the ware has been found from Hallur, Kesarapali, T. Narsipur and Adichannalur, mostly from Iron Age deposits. The yield of this ware from the Megaliths is well known.

A general review of the widespread distribution of the ware from second half of the third millenium B.C. down to the beginning of the Christian era in different parts of our country has vexed the scholars with various problems. Who were the people or peoples who introduced this ware or technique of inverted firing ? Does the ware represent a single culture or can the black-and-red ware people or peoples can be identified with any ethnic group or groups ? Several views were presented by number of scholars on these issues and it is not a place to elaborate them. The latest being that of K.M. Srivastava who thinks[4] that, "A set of people in certain parts of the country learnt and adopted the technique of producing vessels with a red exterior and black interior from the group of people in another region. These was no mass movement of people so far as the occurrence of the Black-and-Red Ware at different sites and different parts of the country is concerned. Once the question of mass movement of people is turned down, there is hardly any ground for assigning the authorship of the Black-and-Red Ware to Aryans or Dravidians or any other community". However the

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[1] S.R. Rao, 'Excavation at Rangpur and other Explorations in Gujarat', *Ancient India*, nos. 18 and 19, 1962-63, (New Delhi, 1963), p. 108.

[2] *Indian Archaeology*, 1963-64, *A Review*, (1967), p. 12.

[3] Y.D. Sharma, 'Protohistoric Remains', *Ancient Remains Monuments and Museums*, Part I, (New Delhi, 1964), p. 28.

[4] K.M. Srivastava, *Community Movement in Protohistoric India*, (Delhi, 1980), pp. 236-237.

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problem still remains unresolved. *Perhaps the dispute will never be solved unless we make a exhaustive and critical study of painted black-and-red and unpainted black-and-red wares as representatives of two different traditions.* We have noted the occurrence of black-and-red ware in different contexts. Here we shall try to confine our study of the black-and-red ware which is found in association with the PGW.

The black-and-red ware found associated with the PGW is distinct[1] in shape and surface treatment from the black-and-red ware, bearing white paintings of Ahar Culture on the one hand, where as on the other hand it is also different from the Megalithic black-and-red ware[2]. This black-and-red ware generally have a burnished black interior and burnished chocolate exterior. The colour varies from lustrous bright to dull black. The exterior chocolate or brown also varies in shade. The vessels are of fine quality, thin and well burnt. However, some coarse variety does indicate that firing was not perfect with the result the core in some specimens is highly porous, thick and gritty. Painting is totally absent and all the sherds are wheel made.

The common shapes during this period are bowls and dishes, generally conforming to the PGW and black slipped ware types. But dishes are not so popular as the bowls. The following are the important types found in the black-and-red ware of this phase.

(1) Bowls with vertical sharpened or incurved rim and carination towards the base (called by us as carinated bowls). This shape is seen at Hastinapura (HST, Types XXXIV and XXXVIIA), Atranjikhera, Allahapur, Noh and Ropar. These shapes are also found in PGW and black slipped ware.

(2) Straight sided bowls are found at Allahapur, Noh, Sardargarh and Chak 86 IA This shape is also found in PGW and black slipped ware.

(3) Hemispherical bowls are reported from Alamgirpur, Allahapur, Atranjikhera and Jakhera. This shape is also found in PGW and black slipped ware but continue to occur in the Early Phase of NBP.

(4) Dishes in black-and-red ware are not reported from Hastinapura. But they are found at Allahapur, Noh, Sardargarh and Atranjikhera.

(5) Basins are rare. But one or two specimens are seen at Atranjikhera and Allahapur.

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1. K. N. Dikshit, 'A Note on the problem of the plain black-and-red ware', *Potteries in Ancient India*, ed. B. P. Sinha, (Patna, 1969), pp. 50-51 and S. P. Srivastava, 'Rajasthan's Post-Harappan Pottery, Black-and-Red Ware from Ahar and Noh—A study in its types and fabrics etc'. *Potteries in Ancient India*, ed. B. P. Sinha, (Patna, 1969), pp. 40-41.
2. B. K. Thapar, 'Maski, 1954 : A Chalcolithic Site of the Southern Deccan', *Ancient India*, no. 13, (1957). p. 64.

(6) No large sized vessels like storage jars were found. In the PGW and black slipped ware fabrics the heavy vessels are also absent.

(7) Miniature shapes, specially vases, are seen at Allahapur and Atranjikhera.

Since black-and-red and black slipped wares represent an earlier tradition, it is not unlikely that PGW people borrowed some of its forms and at a later stage all these three wares became the components of the same culture.

Red Wares :

Red ware may well be regarded amongst the most important keys that the archaeologist has, for it may unlock the regional variation, the currents or cross-currents in a culture, which would otherwise have remained unknown through the study of *deluxe* wares alone. The *deluxe* wares are explicitly mirrored in the whole pottery assemblage and can continue to be treasured for a couple of years after the concerned date of its manufacture. But a red ware pot, being rough and less costly, would normally be discarded without any hesitation after one use. The ware involved less labour and cost on production. Hence the total number of red ware specimens in any collection is greater than the *deluxe* wares. The same is the case with the red ware found in association with the PGW. We shall, therefore, lay more emphasis on the study of this ware which has not been done in earlier works. Barring Hastinapura, at none of the PGW sites these are either fully described or illustrated. However our first hand examination of several unpublished collection and a published work[1] on PGW has helped us to draw the following conclusions :

Red ware of the PGW assemblage can be divided broadly into two categories (1) Red slipped ware and (2) Unslipped red ware in which the fabric, as a rule, is medium to coarse.

(1) Red Slipped Ware :

This group has a smooth paste, well baked, comparatively fine in fabric and consistently treated with a slip or a wash and also sometimes burnished. In short, it shares almost all the features of the black slipped and plain grey wares except the colour. Instead of firing under reducing conditions (as in the case of black slipped ware and PGW), these were fired under oxidizing conditions and thus turned red. Stratigraphically too, they occur in all the layers in association with the black slipped ware, plain grey ware and PGW. So it was neither an earlier nor a later innovation but a contemporary ware flourishing side by side with the PGW. This group is well represented not only at PGW deposits of Hastinapura, Atranjikhera, Jakhera,

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[1] Vibha Tripathi, *The PGW—An Iron Age Culture of Northern India*, (Delhi, 1976), pp. 69-80.

Allahapur, Alamgirpur, Ropar, Noh, Kampil, Kesari, Hulas and Batesvara etc. but also from the corresponding strata of comparable age (pre-NBP and Early NBP Phases) of Prahladpur, Rajghat, Sravasti, Sonepur and Chirand etc.

Dishes and bowls which closely follow plain grey ware, PGW and black slipped ware shapes, are the common forms. But in this case, dishes, out number the bowls while in PGW and black slipped ware, the bowls out number the dishes. The basins, miniature pots, and vases are also reported in this fabric. Carinated dishes with their variants are the main form to be seen at Hastinapura, Alamgirpur, Allahapur, Jakhera, Atranjikhera and Noh. Convex sided bowls with variety of rims occur at Hastinapura (HST., Types XXXa, XXXb and XXXII), Allahapur, Ropar and Sardargarh. Basins, though less common, are found at Hastinapura (HST., Types XXXI and XXXIA), Allahapur, Ahichchhatra, Alamgirpur, Noh and Jakhera. These collared basins are also found in the Early Phase of NBP. Vases with constricted neck and globular profile along with their variants are found at Hastinapura (HST., Types XVI, XVII, XVIII, XVIIIa and XIX). Another variety in the vases are the high necked vessels. These are well illustrated at Hastinapura (HST., Types XX, XXI and XXII) but also found at Allahapur, Ahichchhatra and Atranjikhera etc. Illustration of a miniature bowl and a vase from Hastinapura (HST., Types XXIII and XXIV) reveal that miniature pots were also produced in this fabric, although on a very limited quantity. The miniature pots are also reported at Atranjikhera, Allahapur and Ropar etc.

(2) Unslipped Red Ware :

This group is noticed in majority, possibly due to the fact that the ware being medium to coarse in fabric, involved unskilled labour and so still less cost on the production. The pots being rough and large-sized were also easily breakable into many fragments and must have been discarded without any hesitation after one use. All the sherds in this group are medium to coarse in fabric, often thick to sturdy and made of coarse clay having large quantity of rough organic material including sand and husk used as binding material. The core specially in large vessels is blackish but in other cases it is red. The firing being imperfect, in a few cases, we get a blackish middle zone in between the two red zones on either sides. The use of small stones in the core was a common practice in this ware. Most of the vessels, seem to have been made on slow wheel as the striation marks are not so close but specimens of large-sized vessels were hand made. In some cases these were fired in an inverted position possibly at a very low temperature, resulting in the inner surface being black and the outer one red. Inspite of all this roughness the ware in some cases is treated with a thin slip or wash which is not burnished and hence appears dull.

Shapes most common in this group are the vases which served as storage vessels. Normally two types of vases are found (a) vase having broad to medium spaced mouth, splayed out rim, constricted neck and carinated to a globular profile. The rim in most cases is slightly thickened at mid-portion or near the neck (HST., Types I, Ia, IIa, X and Xa). (b) Vases with high concave necks (HST., Types IV, V, VI, VIII and XI). These shapes on other PGW sites generally conform to the shapes found at Hastinapura. It may be noted that these two types of vases with their variants are not to be found in the first group of the red wares *i.e.* in red slipped ware. These shapes are common in the corresponding strata of comparable age (*i.e.* in pre-NBP and Early NBP Phases) on sites of eastern U.P. Bowls are rare but they are reported at Hastinapura (HST., Types XIV and XXXII), Alamgirpur, Allahapur and Atranjikhera. Basins are also reported from Hastinapura (HST., Type XXX(a), Atranjikhera, Ropar, Alamgirpur and Ahichchhatra. A lipped basin has been found at Ahichchhatra although this shape is not reported from the PGW deposit of Hastinapura. Footed bowls with perforations have not been reported at Hastinapura but these are found at Atranjikhera and Ahichchhatra. Such footed bowls with or without perforations are found in the contemporary strata of Sravasti, Prahladpur and Rajghat etc. Perforated vessels are also reported at Ropar and PGW sites of Bikaner region.

Decorated Varieties of Red Ware :

Majority of red wares is essentially plain. However in a few cases at Hastinapura and Atranjikhera thick black bands have been noted on the neck and shoulders of the vases (HST., Type Ia). Such type of black painting is also noted in contemporary levels (pre-NBP and Early NBP Phases) of Sravasti, Prahladpur and Rajghat. At most of the sites, however, red ware group shows some kind of stamped or incised decoration. The stamped decoration on red wares is more common on the PGW sites found outside the Ganga Plains. The incised designs are more common on the PGW sites of the Ganga Plains like Hastinapura, Allahapur, Ahichchhatra and Atranjikhera. At Hastinapura the only decoration met with in this ware are a few impressed patterns. But none of these patterns are illustrated. Similarly these decorations are also reported at Atranjikhera. Vibha Tripathi notes that stamped designs like spirals, group of concentric circles, oblique strokes, sun-pattern and turile bone pattern are common on the PGW sites of the Bikaner region. The incised designs are seen at Atranjikhera, Allahapur, Ahichchhatra but not at Hastinapura. It is interesting to point out that incised designs are also reported in the Early Phase of NBP at Sravasti and other sites of eastern U.P. and Bihar.

We may now examine whether this red ware associated with PGW had an earlier beginning. Deshpande thinks that ripple decoration found on the OCP pottery of Ambakheri is similar with the ripple marks noted on the red ware associates of the PGW phase. So he[1] points that OCP being an indigenous industry influenced the PGW to a certain degree which was a foreign tradition. B.B. Lal also demonstrated that a few shapes of OCP from Lal Qila and Saipai are similar with the red ware shapes of the PGW phase[1]. Vibha Tripathi also somewhat thinks in the same line but pleads for more work in this direction. *Not withstanding the casual views expressed by these scholars it may be pointed out that in order to know the impact of one culture upon the other such sites should be chosen which may show a cultural continuity. Lal Qila is a single culture site, deserted by the people who had occupied it. There is always break of occupation between OCP and the PGW deposit and hence the comparison made may be misleading. Instead, we may examine whether any of the red ware tradition from the black-and-red and black slipped wares phase survived in the succeeding red ware tradition of the PGW phase. Because there is no cultural or stratigraphy-ycal gap between these two deposits on any of the Ganga Plains.*

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[1] M.N. Deshpande in *Indian Prehistory*, (Poona, 1965), p. 29 and M.N. Deshpande, 'PGW in Ganga Valley' a paper read at Seminar on PGW held at Aligarh Muslim University, Aligarh in 1968.

THE POTTERY COMPLEX OF THE NBPW PERIOD

From the emerging pattern it is well indicated that the Northern Black Polished Ware occurs in two distinct horizons or two sub-periods, termed as the Early Phase of NBP and the Late Phase of NBP. We shall study below the characteristic potteries of these two phases.

B : THE POTTERY COMPLEX OF THE EARLY PHASE OF NBP :

Northern Black Polished Ware (NBP) :

NBP was first recognized by Sir John Marshall in the year 1911-12 from Bhita excavations[2]. Later he again found more sherds of NBP from the lower strata of Bhir mound excavations at Taxila. He called these sherds as fine black lustrous pottery and thought that these were similar to the Greek Black Ware. Further he ascribed its introduction in the sub-continent with the advent of Greeks in India[3]. But its discovery in the pre-Mauryan leve's at Bhita, however, was of interest and Codrington on the basis of insufficiently precise nature of diggings at Bhita, thought such an early date of NBP, as untenable[4]. This

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1. Quoted by Vibha Tripathi in her, *The PGW—An Iron Age Culture of Northern India*, (Delhi, 1976). p. 79.
2. J. Marshall, 'Excavations at Bhita', *Annual Report of the Archaeological Survey of India*, (Calcutta, 1901-1910), p. 40 ff. Also Annual Report of the Archaeological Survey of India, 1911-12, pp. 37, 80 and 81.
3. J. Marshall, *Taxila*, vol., II, (Cambridge, 1951), p. 432.
4. K. de B. Codrington, *Man*, (1929), no. 101. Marshall's observation regarding the occurrence of fine black lustrous sherds (NBP) in the deposits of the 7th-8th century B.C. and the absence of brick structures in the lower strata are now finding confirmation from several excavations. Irrespective of the method of digging followed by him in 1911-12, his findings indicate clear distinction between two cultural stages of NBP, one pre-structural and the other structural. Curiously, his first discovery of NBP from Bhita is also from the region eastern U.P. which is now called as the homeland of NBP.

was the status of the ware till 1945. In 1946, not only an up-to-date list of the distribution of the ware was published, but its distinctive fabric was also described by Wheeler and Krishna Deo. Referring to the limited specimens of NBP from Ahichchhatra and Taxila they described it, "The fabric is a finely levigated clay which is usually grey but sometimes reddish in section, with a brilliantly burnished slip of the quality of a glaze, ranging in colour from jet-black to grey and a mettalic steel-blue, occasionally varied with reddish brown patches. The ware is readily distinguishable by its brillance from other polished or graphite coated black ware which occur also in South India". They also discarded the view of Marshall who regarded NBP as a kind of Greek Black Ware on the ground that at Taxila NBP was mainly of pre-Greek period. This was the first definition of the NBP of Ahichchhatra. After the excavations of Hastinapur, B.B. Lal and B.K. Thapar[1] gave more precise and detail definition of this pottery in 1954-55. This definition of NBP having usually thin section, grey core and distinctive glossy lustre as given by Wheeler-Deo and Lal-Thapar was universally accepted. With this distinctive fabric in mind, it has been described by S.B. Deo[2] and Ansari in 1958, Wheeler[3] in 1959, Thapar[4] again in 1967, K.K. Sinha[5] in 1967, and A.K. Narain and myself[6] in 1969. A careful study of the above definition of NBP shows that it does not cover all the types of NBP. A possible explanation for this may be that except at some sites of eastern U.P. and Bihar, the occurrence of NBP was very limited[7]. Even on a few where the number was large the emphasis was laid only

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1. B.K. Thapar, in *Ancient India*, nos. 10 and 11, pp. 50-52.
2. *The Excavations at Maheshwar and Navdatoli,* 1952-53, (Poona, 1958), pp. 132-134.
3. R.E.M. Wheeler, *Early India and Pakistan*, (1959), pp. 30-31.
4. B.K. Thapar, *Ancient India*, nos. 20 and 21, 1967, pp. 71-75.
5. K.K. Sinha, *Excavations at Sravasti*, (1967), pp. 22-23.
6. A.K. Narain and T.N. Roy, *The Excuvations at Prahladpur*, (Varanasi,1968), pp. 20-22.
7. The Hastinapura excavations yielded only 101 specimens of NBP. At Maheshwar out of the 20 sherds only 13 came from stratified layers. All these 20 sherds on the basis of the thickness were grouped into three fabrics, the thickness, however, varied from 1.5 mm to 8 mm. At Prakash, only 10 sherds were found. At Sravasti although the numerical proportion of the NBP was much more than the above sites but the majority have thin walls and in this respect, according to excavator, they can be compared well with PGW which also universally has a thin section. At Prahladpur, in a limited excavation of less than two months, the number of NBP sherds with strikingly lustrous finish was fairly large. But here the evidence of NBP differs from other sites in another aspect. Here some NBP sherds exhibit the evidence of their being found in experimental stage. Although in the majority of sherds the type of slip suited well with the body clay but in some cases defects like crazing, scaling, spitting and crawling were noticed (Narain and T.N. Roy, (1968), p. 23, Plate X). Secondly although the surface colour in majority of sherds was black but a group of specimens showed the combination of two colours (See Narain and Roy, (1968), p. 21). We have, therefore, called the Early Phase of NBP at Prahladpur as the Golden Period for the slip decorative technique in the ceramic tradition of ancient India.

on those sherds which were highly lustrous. In the beginning when not many sites were excavated the above definition of NBP could have hardly been possible. But now with the excavations of more than 80 NBP sites and with much more material at our disposal, it is obvious that the above definition applies only to top-graded NBP. But all NBP are not top-graded, *i.e.* not so highly lustrous and thin in section. Hence the concept of this standard NBP has to be revised. Now it appears that NBP is not a single homogenous type of ware as defined earlier produced out of one single technique.

At Rajghat, the NBP is the major ware of the Early and Late Phases of NBP, *i.e.* of Sub-periods IB and IC. It accounts for nearly fifty[1] percent of the total pottery recovered from these deposits. The numerical proportion of this ware is not only much more[2] than Prahladpur, Ayodhya and Takiaper, the other NBP sites excavated by us, but probably, also from other sites. We have studied the NBP from all these sites and on the basis of surface colour, notice, two very clear and broad strains in it.

(1) Monochrome NBP or NBP having one shade of colour.

(2) Bichrome NBP or NBP having two shades of colour.

MONOCHROME NBP :

The surface colour of about ninety percent of the sherds in this group is jet-black or brownish black or bluish black. The remaining ten percent are either steel blue, pinkish, silvery, golden, brown, chocolate, violet and deep red. All these colour variations may not be intentional[3]. These may be further divided into five fabrics.

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1. A.K. Narain, and T.N. Roy, *Excavations at Rajghat*, Part II, *The Pottery*, (Varanasi, 1977), p. 25.
2. This is probably because Rajghat was excavated for nine season's.
3. J.L. Keslo and J.P. Thorley after detailed examination of the Palestinian pottery said that the colour variation is due to chameleon nature of iron in red clay. See, Keslo and Thorley, 'The Potter's Technique at Tell Beit Mirsin', *The Manual of the American School of Oriental Research*, XXI-XXII, 1943, p. 90. D.H. Gordon thinks that explanation for colour variation given by Keslo and Thorley may also hold good to many of our Indian pottery. See *A.I.* nos. 10 and 11, p. 176. In fact P.S. Rawson suggested that "NBP pots were fired in open saggars (refractory clay boxes) stacked one above the other in the kiln. The ware in saggars closed by a saggar above then would fire in fully reducing atmosphere, whilst the ware in the top saggar, which could be open, would fire in an oxidizing atmosphere and thus come from the kiln red". See *Man*, 1953, Art 58, pp. 41-42. This if true may explain a small proportion of red NBP which is of the same form and fabric as the grey ones.

FABRIC A :

NBP coming under this head is hard, dense having a fine body fabric with thin sections. The sherds have a glossy surface with highly lustrous sheen and it is difficult to scratch their surface with a nail or knife. These pieces, when struck, give a sharp metallic sound. These may be called as top-graded NBP. There was complete harmony between the type of the slip, firing and the clay body with the result not a single sherd in this fabric show any kind of defect like crazing and crawling etc. These are perfect specimens of NBP in which the potter has put his hand, heart and mind. These pieces give joy to the excavator even now as they did to the lucky creator in the past. It was a prized commodity and hence referred by as '*deluxe*' ware of the time. Instances that it was repaired by copper wire or pin-riveting are also reported from sites like Ropar, Bairat, Besnagar, Ujjain, Broach, Sonepur, and Kumrahar. It was in limited supply due to less potting or high cost of production. However, it is found in fairly large quantity on sites of the eastern U.P. and Bihar. This fabric had its root in the Early Phase of NBP which was its also formative period. Its occurrence in the Late Phase of NBP, admittedly in a small numbers, may indicate its survival as a treasured fabric. It is mostly this fabric of NBP, which has been defined, dealt at length and technically examined by various scholars. The flanged and corrugated bowls are the only shape so far reported in this fabric. Dishes are not found in this fabric.

FABRIC B :

These are not so hard and compact as those of Fabric A. The sherd are comparatively thick and can be scratched with a knife more easily than those of Fabric A. A limited number in them bear prominent burnishing marks and they do not show the same lustre as is retained by the top-graded NBP. These are less glossy and smooth. It is difficult to distinguish these sherds from the black slipped ware. In typology, however, there is a clear distinction between the two. The straight sided, carinated and sub-ovaloid bowls which are very common shapes of the black slipped ware are totally absent in this type of NBP. Dishes are found in large number. The shapes of the bowls are akin with those found in Fabric A. No large sized vessel like vases or storage jars have been reported. It appears that this fabric was also sparingly shaped and technologically represent a stage in between black slipped ware and the top-graded NBP (Fabric A).

Even though there is a fair amount of variety in these two fabrics mainly in the colour, these are linked by some common features :

(1) The nature of clay used is well-levigated and does not show any sign of tempering material.

(2) The core is always grey. Below a thin slip of shinning black or any other colour, a grey surface (both outer and inner) is seen. This shows that all the pots in these two fabrics were fired under reducing condition.

(3) The paste is fine and the pots were invariably potted on a fast wheel.

FABRIC C :

In this fabric, the core of the sherds are red but also tends to be greyish in some cases. But below the shinning black or brown slip there is always a red, buff or orange-yellow matt surface. The peeling of the slip, the red matt surface and greyish-red core suggest that the pots may have been fired in both oxidizing and reducing conditions. But this point needs to be checked by technical analysis.

FABRIC D :

In this group, the sherds are usually black and red but other modification of colours are also found. These are invariably thin in section and have a lustrous finish similar to those of Fabric A and B. The shapes are also restricted to bowls and dishes but the colour combination of black and red appears to have been produced by process of inverted firing. But these are definitely different from the black-and-red ware which are also found associated with NBP in the Early Phase of NBP. This associated black-and-red ware are poor in texture and firing. The core in this case is highly porous, thick and gritty. The shapes are also different. Thus this Fabric C may justifiably be construed as the sub-variation of NBP in which only the colour combination was produced by inverted firing.

FABRIC E :

This is the coarser variety of NBP. It is more prolific in the Late Phase of NBP and is very distinctive of this phase. The sherds are thicker in section, having darkened unoxidized smoky core and relatively low-fired. The surface colour of the pot ranges from dull black to dull grey. The example of true shinning slip being very rare. The surface dressing is either a self-slip or a wash. Most of the pots were without any slip treatment. The fabric as a whole is crude and debased. In the general repertoire of the pots in this fabric, the occurrence of small sized bowls and dishes, vases, basins and carinated *handis* are particularly noteworthy.

BICHROME NBP :

These are also typical NBP sherds. Their chief characteristic is that they exhibit the combination of two colours, mostly contrasting in shade, having been employed on one vessel. The surface colour in the monochrome group of NBP is always one although there is wide range of colour variations. In this variety a design in one colour is set off against the other, so that, there may not be any overlap between two colours. It is in these sherds that we have some designs which appears to have been copied from the painted designs of the PGW. The common pattern of producing thick and thin horizontal bands, vertical strokes, vertical strokes coming out from a horizontal rim band, transverse band or stroke and simple circular bands or arches common in the Painted Grey Ware are also found in the bichrome variety of NBP of Kausambi, Rajghat, Sravasti, Prahladpur in Uttar Pradesh and Bahal in Khandesh[1]. In this fabric we also get some sherds in which the horizontal division of the two grades of colour is very clear. The upper portion of the body has the better quality of lustre and colour while the lower portion a less superior finish and different colour. Such sherds have been also reported at Sravasti[2]. But the technique of producing these painted specimens of NBP totally differs from that of the PGW in which the unfired pots are painted with a colour-dipped brush. This results in the production of a separate layer of painted design superimposed over the plain grey surface. So on PGW the designs are pigment colour-oriented. But in painted NBP it is slip-colour-oriented in which one colour is set off against the other. Although a few designs have been copied from the PGW, but the technique of painting totally differs. It is somewhat similar with the one found on Athenian vases. In this connection Miss Richter[3] observation on Athenian pottery is worth mention. She says that accidental and intentional red glaze on Athenian pottery is due to double painting and double firing. At first only that portion of the pot was painted which were to come out black. The pot was then subjected to oxidizing and reducing stages of firing. The firing was then stopped and the pots were allowed to cool down. Then that part of the pot which was to come out as red was painted. This was again fired under oxidizing condition. The area which was painted later came out as red whereas the previously painted parts came out as black. It is doubtful whether these NBP pot were also prepared in similar manner ? The most common specimens in this group are the sherds in which a design in black is set off against the red or a design in red is set off against the black, in both cases, there was no overlap between the red and black areas. The other combination of colour are dark steel blue set off against red, grey set off against light red, black set off against dark-brown, black set off against brown, and black set off against ash-grey. The shapes are similar than the ones which commonly occur in other fabrics of this group.

From above showing it is apparent that NBP is not a single homogenous type produced out of a single technique. It has out grown its definition and is now a big institution under which several other types find their affiliation. In this connection it is pertinent to refer to

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1. T.N. Roy, Stratigraphical Position of the PGW in the Gangetic Valley, *Bharati*, no. 8, Part II, (1964-65), p. 69, and also T.N. Roy, 'A Comparative study of the Paintings from the NBP and PGW levels', a paper red at the conference of I.A. Society held at Patna University in 1969.
2. K.K. Sinha, in *Excavations at Sravasti*, (1967), p. 23.
3. G.M.A. Richter, "Accidental and Intentional Red Glaze on Athenian Vases", *The Journal British School at Athens*, XLVI (1951), pp. 143-145.

S.P. Gupta's comment in which he rightly asserted that NBP has out grown its limit and how can one, therefore, suggest a single term that may justify the existence of all these wares[1].

It has been also generally felt[2] that the name Northern Black Polished Ware is no longer correct in the present context. For neither the ware is confined to Northern India nor it occur only in black colour nor its christended attribute polish is true. This fallacy has been pointed out by B.K.Thapar[3] as early as 1967 and to some extent by Sachida Nand Sahay[4] in 1969. However, arguments favouring a change in the name as well as those which favouring retaining the present nomenclature were retraversed[5] by K.K. Sinha in a seminar organized for this purpose at Delhi in 1971-72. After discussion[6] it was resolved that the present name NBP should be retained. A somewhat similar plea for retaining the name was also made by Wheeler[7] in 1962. Even though the ware has outgrown its definition and limit, it creates no difficulty in recognizing it.

The ware has also not lost its value as a self datable criterion. All that we have to see is its true context. For now NBP is found in two clear phases, the Early Phase of NBP and the Late Phase of NBP. The associated material and date of both these phases differ.

The Associated Wares of the Early Phase of NBP :

The entire range of the associated wares in the Early Phase of NBP comprises mainly of five ceramic industries, (1) the PGW, (2) the plain greyware, (3) the black slipped ware, (4) the black-and-red ware and (5) the red ware.

On first hand examination of several unpublished collections, all these wares are similar in fabric and types with the associated ceramic of the PGW complex and hence need not be retraversed here. However two differences which are very clear may be noted.

(1) Plain grey ware and PGW are widely distributed on western sites of the plains. The PGW, while it moves towards east tend to peter out and beyond Sringverapura its

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1. This comment was given by S.P. Gupta at the seminar of NBP held by the Indian Archaeological Society in 1971 at New Delhi. See *Puratattva* no. 5, (1971-72), p. 36.
2. Professor Heartel voiced his concern over the continued usage of the name NBP at the meeting of the Indian Archaeological Society at Nagpur in 1970.
3. B K. Thapar, in *Ancient India* nos. 20 and 21, pp. 71-75.
4. Sachida Nand Sahay, in *Potteries in Ancient India*, (1969), pp. 145-146.
5. K.K. Sinha, in *Puratattva* no. 5, (1971-72), pp. 29-33.
6. *Puratattva* no. 5, (1971-72), pp. 33-38.
7. Mortimer Wheeler, *Charsada : A Metropolis of the Northwest Frontier*, (London, 1962), p. 42.

frequency is almost nil. Similarly black slipped ware and NBP are an easterly tradition. The NBP, while it moves towards west tend to peter out and beyond Sravasti its frequency is almost nil. Synchronizing with the PGW phase which is devoid of NBP at Mathura, Ahichchhatra, Atranjikhera, Jakhera and Pariar, there is a pre-NBP, at Prahladpur, Rajghat, Sarai-mohana, Sonepur and Chirand which is devoid of PGW. The Early Phase of NBP (in which we get both PGW and NBP) explains the contact of these two individual wares. Thus in the PGW phase of the Ganga Plains we do not get a single sherd of NBP, while in the Early Phase of NBP on some sites we do get PGW in limited number. This shows that PGW was an elder contemporary of NBP and coexisted with it for a much more time than hitherto thought to be. This is borne out by the various similarities we notice on these two wares. Even though the PGW and NBP have their own distinct identity and different distributional zones, yet they may justifiably be linked with the following common features :

(1) The nature of clay used is well levigated and does not show any trace of tempering material.

(2) The pots were generally fired in a reducing condition resulting in grey cores. Outer surface turns grey or black or their modifications[1]. Grey core is such a distinguishing feature of this group that even in the red varieties of the PGW found at the recently excavated site of Ahichchhatra the core is grey. Similarly in the red varieties of NBP found at Rajghat, the core is also grey.

(3) All these show similar tradition of shapes[2]. Bowls and dishes are the most common. Vases and basins are rare and heavier shapes are entirely absent.

Basically all the wares in this group represent a type of table wares. The PGW and fine NBP show there *deluxe* nature. Pointing to the similarity between PGW and the NBP, the author[3] said in 1964, "All the technical details of the PGW like well levigated clay, superior qualityof paste, wheel-turned, thin well burnt section, blackish grey core and greyish-brown or even dark in surface colour are quite akin with that of NBP. Of course, there is slight difference in the surface treatment and the abundance of the painted specimens of the PGW". Coming to the typology of the vessels, we find that the straight sided, hemispherical, convex and corrugated bowls of the PGW occur in the NBP Ware. The carinated, subovaloid and convex sided dishes also occur in both these types of ware. Then both these wares have not yet yielded any heavy vessels like storage jars and globular pots. Thus we find that in almost all the technical details including even the typology both the wares are similar. Sinha[1] in 1971 made a some what similar statement. "The highly striking surface lusture of the NBP tends to obliterate the points of apparent similarity between the two wares. There is a near identity of shapes between the two wares, the core is grey in both the cases and thinness of the body is a feature common to both. The difference between the two appears to be confined only to the surface treatment—the painting of the PGW giving way to the lusture of the NBP ware".

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[1] This depends on the nature of iron in clay or the type of surface treatment or upon the reducing or oxidation condition of the kiln.

[2] A.K. Narain and T.N. Roy, *The Excavations at Prahladpur*, 1963 (Varanasi 1968), pp. 61—69.

[3] T.N. Roy, 'Stratigraphical position of the PGW in the Gangetic Valley', *Bharati*, no. 8 Part 11, (1964—65), p. 69.

(4) In the tradition of paintings there is also apparent similarity between the wares of this group.

(A) The painted designs of the PGW giving way to slip designs of the NBP. We have also hinted this point of similarity in paintings designs as early as 1964. The common pattern of producing thick and thin horizontal bands, vertical strokes, vertical strokes coming out from a horizontal rim band, transverse band or stroke and simple circular bands or arches common in the PGW are also found in two coloured specimens of NBP (Bichrome NBP) of Kausambi, Rajghat, Sravasti and Prahladpur in Uttar Pradesh and Bahal in Khandesh[2].

(B) Similarly various painted designs of the black slipped ware and black-and-red ware of Prahladpur, Rajghat and Gularihavaghat in white on black surface compare well with PGW designs. These are groups of vertical lines, groups of oblique lines, concentric circles and rows of dots[3]. According to B. P. Sinha[4] the designs on Chirand pottery compare well with PGW designs. K.K. Sinha also felt that painting tradition of the black-and-red ware has a tendency to borrow the paintings of the PGW[5]. Not only this but the reserve technique used in PGW is found on black-and-red ware and black slipped ware sherds of Rajghat, Prahladpur and Gularihavaghat (Basti).

(C) Thapar[6] defines the technique saying that the designs has been picked out in yellow or pale red by painting or 'stopping' the rest of the surface of the pot in

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1. K. K. Sinha, in *Puratattva*, no. 5, (Delhi, 1971-72), p. 33.
2. T. N. Roy, op. cit., 1964-65, p. 69.
3. T. N. Roy, 'A Comparative study of the Painting from the pre-NBP deposit and the PGW level', a paper read at Seminar and Conference of Indian Archaeological Society, held at Patna University in 1969.
4. B. P. Sinha, in *Potteries in Ancient India*, (Patna, 1969), p. 111.
5. K. K. Sinha, in *Potteries in Ancient India*, (Patna, 1969), p. 109.
6. *A. I.* nos. 10 and 11, p. 32, Figs. 6, 7, 8, 9, and 10, sherd nos. 9, 21, 28, 31, 33, 36, 63, 66, 67 and 72.

thin dark slip. Examples of this type of paintings are found on the sherds of the black slipped ware and black-and-red ware from Gularihavaghat[1], Prahladpur, Rajghat and Khairadih. At Prahladpur in one case on the inner base of a black slipped ware sherd, a group of wavy lines of unequal thickness has been picked out in ash-grey by applying or 'stopping' the remaining body with a dark black slip[2].

(2) The second significant difference between the PGW and Early Phase af NBP of the Ganga Plains lies in the fact that some of the black-and-red and black slipped wares found associated with the Early Phase of NBP are painted. The paintings are totally absent in the above associated wares of the PGW phase.

C. THE POTTERY COMPLEX OF THE LATE PHASE OF NBP :

The pottery of this phase suffered decline not only in the quality of the clay, shaping, surface treatment but also in firing. The black-and-red ware was completely absent. In the beginning of this phase, the PGW and black slipped ware were found almost in negligible quantity but as the time rolled on, their use was also given up completely. NBP, however, continued but considerably decreased in number. Instead the people during this phase developed another class of pottery known to the archaeologists as coarse grey ware and coarse NBP. In addition to these two wares, which may be regarded as the main distinguishing feature of this phase, the people also used unslipped red ware. In contrast to the preceding PGW and Early NBP Phases, the pottery from this phase clearly display lack of sophistication and is essentially utilitarian. Whether this could be attributed to the changing need of the people or to the arrival of more vessels of metal during this phase, will be discussed later.

(1) Coarse Grey Ware :

The grey ware of this phase is generally coarse and thicker than the PGW and plain grey ware of the preceding phase. The ware has grey gritty core and blackish-grey surface and is not fired at such a high degree of temperature as the PGW or plain grey ware. The ware as a whole is crude and does not exhibit any painted designs. Bowls and dishes continue to occur also in this fabric. There are, however, some additional types in the coarse grey ware of this phase, viz. featureless carinated *handi* and basins with collared rim, occasionally 'lipped' and bowls with internally bevelled rim. Noteworthy exception in this class of pottery are the bowl and dishes which are decorated on the interior of the base with impressed designs of raised concentric circles often with a central knob or grooves or rosettes.

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[1] T. N. Roy, *op. cit.*, Patna, 1969.

[2] Narain and Roy, *The Excavations at Prahladpur*, 1964, (Varanasi, 1968), p. 18 and 68, Pl. X, T. 3A.

(2) Coarse NBP :

Though the people had not given up the use of highly lustrous sherds of NBP (our Fabric A or top-graded NBP) altogether, but they did not find this *deluxe* variety suitable for their daily use. So they had to develop another variety of NBP (our Fabric E-*Supra*) which is quite distinct in colour and fabric from the top-graded NBP (our Fabric A) which was so common in the preceding Early Phase of NBP. This ware is thicker in section, having darkened unoxidized smoky core and relatively low fired. The surface colour of the vessels ranges from black to dull grey. The surface dressing is either a self-slip or a wash. The fabric is debased and crude. The general repertoire of the pots in this group, consist of small sized bowls and dishes, vases, basins and carinated *handi* (the type occurring in the coarse grey ware). Although it is much thicker and coarser in section than its predecessor, the top-graded NBP, but there is definite generic relationship between the two since the bowls and dishes were common to both.

(3) Unslipped Red Ware :

In the red ware, which was generally of medium fabric and unslipped the most striking types were; pear-shaped vases popularly known as Ahichchhatra 10A, carinated *handi* (the type found in coarse grey ware and coarse NBP), *karahī* with loop handle, basins with lug handles, shallow bowls with flat base and dishes with sagger base.

All these types are very well illustrated in *Hastinapura Excavation Report* as well as *Rajghat Excavation Report*, Part II, *The Pottery*, (Varanasi, 1977), pp. 39-45 and hence does not need any illustration.

D. Technical Investigations made on NBP

We have seen that the concept of standard NBP with a distinctive lustrous surface finish needs a revision. This glossy brilliance has also raised several enquiries as to the actual method of the production of this ware. The views of Sana Ullah in 1946, Archaeological Chemist as quoted by Wheeler in 1947-48, P.S. Rawson in 1953, B.B. Lal in 1955-56 and 1959-60, Miss Bimson quoted by Wheeler in 1969, K.T.M. Hegde in 1962, 1966 and 1970, H.C. Bhardwaj in 1959 and ours in 1971 who have technically examined the ware are discussed below :

Sana Ullah[1] reporting twice said that the black coating contains about 13% ferrous oxide which is responsible for the black shade. The original slip was a highly ferruginous body and was applied to the surface of the pot before firing. The presence of ferrous-lime and ferrous-magnesia which being of low fusibility bring about the fusion of the black film during burning and also account for high lustre of the specimens. He says that although Lucas[1] has tried to prove that black colour of the pottery is due only to carbon, yet his experiments leave no doubt that ferrous silicate is also produced. Thus he holds the possibility of the deposition of carbon and some tarry matter in the pores to enhance its black colour.

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[1] *Ancient India, no. I* (New Delhi, 1946), p. 58.

The above observation of Sana Ullah clearly point out that he has examined highly lustrous sherds of only black colour, *i.e.* one of the colours found in the big lot of NBP.

In 1947-48 on the excavation report of Brahmagiri and Chandravalli published in *Ancient India*, No 4, Wheeler said that "The black polished ware, distinctive of the pitcircles seems to have been fired at a low temperature as it weathers much sooner than the red. This black ware of the megalithic sites of South India and the Deccan has been compared to the typical black polished ware well known from Northern Indian sites[2], but it should be stressed that the two wares are easily distinguishable. The northern black ware has a fine fabric, is very well fired, has a polish giving almost a metallic lustre and is shaped on a fast wheel, while the black megalithic ware is coarser, less well fired, usually not so highly polished and is normally potted on a slow wheel." This he said on the basis of Archaeological Chemist Note[3].

P.S. Rawson[4] observed that "the grey-bodied wares can likewise be accounted for firing under special reducing conditions. It is probable that grey wares of the Ganges valley sites were fired in open saggars stacked one above the other in the kiln. The ware in saggars closed by a saggar above them would fire in a fully reducing atmosphere, whilst the ware in the

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1. This observation of A. Lucas is based on the examination of Ancient Egyption black topped pottery and not NBP.
2. K. de B. Codrington in *Man*, (1930), no. 139, p. 190.
3. This note has been quoted in *Ancient India*, no. 4, p. 208. The Archaeological Chemist report on the difference is as follows :

   "After turning on the wheel, the pots of the NBP Ware appear to have been subjected to elaborate rubbing and burnishing, and then coated with a finely levigated, highly ferruginous clay, and again burnished to smooth the surface. The pots were then fired under reducing conditions to a temperature producing an incipient fusion of the slip. This accounts for the exceptional hardness and lustre of the pots. In the Megalithic black ware (Southern Black Polished Ware) the pots were not finished with so much care. A thinwash of ocherous clay seems to have been applied, and the pots fired in a reducing atmosphere at a low temperature than in the case of the Northern Black Polished Ware. The slip in the latter stands out as a distinct layer, whereas in the former it is notably less distinct".
4. P.S. Rawson, 'The Surface Treatment of Early Indian Pottey', *Man*, (1953), Art 58, pp. 41-42.

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top saggar, which would be open, would fire in an oxidizing atmosphere and thus come from the kiln red. The hypothesis is borne out by the presence on the Ganges sites of a small proportion of red ware of the same form and fabric as grey. In view of the close association on the sites of the Northern Black Polished Ware with the grey wares, and what was proposed above concerning the method of applying haematite dressing, the Northern Black Polished Ware can be explained as a haematite dressed ware, saggar-fired".

It appears that Rawson has not only examined the black variety of the standard NBP but also red variety of the same form and fabric. He said that they were fired under reducing condition in open saggars (refractory clay boxes) kept one above the other. Thus the pots on the top are fired in the oxidizing condition and thus turn red. The remaining pots below turn grey. This explains the small number of red coloured NBP which we also get along with the large number of grey or black NBP. But both these varieties of NBP also come under our Fabric A, *i.e.* under the standard concept of NBP.

B.B. Lal on the basis of his observation concluded twice that "The lustre on the surface of the ware, therefore, appears to be composed of some easily fusible material, possibly of organic origin, which undergoes incipient fusion at a low heat. The layer just below the uppermost film was, in most cases, noticed to be buff or orange-yellow. The blackening of the upper most surface may, therefore, be due to some sort of post-firing treatment, in which the pottery, still hot from the kiln, was coated with some liquid such as a oil, juice of some plant or a similar organic concoction. He further states that the exact conditions of firing and the nature of the ferruginous material employed in its manufacture still remained elusive".

Lal it appears has examined mostly NBP sherds coming under the fold of our Fabric C in which below the shinning black slip there is always a red or buff or orange-yellow matt surface. This type of NBP has mostly been found at Hastinapura. However, his observation concludes that black lustre of this type of NBP may have resulted by some type of post firing treatment in which the hot pottery was coated with some organic liquid.

According to the observation of Miss Bimson[2] of the British Museum Laboratory, NBP was not subjected to burnishing as thought by the Archaeological Chemist in India[3]. According to her 'the unfired pots were dipped in a suspension of ferruginous inorganic

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1. *I.A.*, 1955-56, pp. 56-57 and *I.A.*, 1959-60, pp. 120-121.
2. Her view has been quoted by Wheeler in *Early India and Pakistan*, (London, 1959), p. 30 and 180 and also in *Charsada*, A *Metropolis of the North West Frontier*, (London, 1962), p. 41.
3. The view of Archaeological Chemist in India has been quoted by Wheeler in *Ancient India*, no. 4, p. 208.

material probably resembling a red earth, and that, after firing to a temperature of 800°C, the kiln was sealed so that the pots cooled in a reducing atmosphere'. She further points out several differences between NBP and Greek black ware. 'When held near the magnet, Greek black is attracted to the magnet, whereas Indian black is relatively non-magnetic. The surface of the NBP ware differs from Greek black gloss in its behaviour when fired. The latter is consistently stable at temperature of C.1000°C, whereas the samples of the NBP ware have shown variations in their resistance to such temperature'.

Miss Bimson view that the pots were dipped in a suspension of ferruginous inorganic material contradict the view of Lal[1] who said that 'the lustre on the surface of the ware appears to be composed of some easily fusible material, possibly of organic origin, which undergoes incipient fusion at a low heat'. The precise nature of the surface treatment also remains unsolved in her study.

According to K.T.M. Hegde view as expressed in 1962[2], 1966[3] and again in 1970[4], "An analytical study of the lustrous coal black slip of the ware indicates a very high percentage of sodium and iron in the slip. When a very small fragment of the slip was held near a magnet it was attracted by the magnet, while a similar fragment of the body was found to be relatively less magnetic......On the surface of the ware is, hence, produced a thin layer of black magnetic oxide of iron which is responsible for the black colour of the slip". "In the production of NBP ware slip, clay suspension was quite likely treated with a clear solution of '*Sajjimatti*'. On heating the slipped pottery to 700°C the sodium components are decomposed to soda which fluxes the clay to form complex silicates which on cooling impart the glaze, like glass, on the surface of the ware". He also said that, "From the crazing tendency of the slip, resulting from the higher coefficient of thermal expansion than the body, it was inferred that the surface dressing was applied on baked clay".

As regards magnetic quality of the NBP slip, the analysis of Hegde is at variance with that of Miss Bimson. According to him the NBP slip is magnetic. He has hinted that the pots were double fired as according to him the surface dressing was applied on baked clay. The frequent peeling of the slip and the defects like crazing which we have observed on some of the NBP sherds of Prahladpur[5], do suggest that the pots may have been fired twice. According

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1. *I A*., 1955-56, pp. 56-57. Already quoted above.
2. K. T. M. Hegde, 'Technical Studies in NBP ware', *Journal M. S. University, Baroda*, (Humanities), XI, No. 1. (April 1962), pp. 159-61.
3. Hegde in '*Current Science*, Volume 35, No. 24 (1966), p. 623.
4. Hegde in 'Physics and Chemistry in Indian Archaeology', paper read at the Annual Conference, Indian Archaeological Society, Nagpur, 1970.
5. Narain and T. N. Roy, *The Excavations at Prahladpur*, (Varanasi, 1968), p. 22 and 37.

to Miss Richter[1], the Athenian vases were also fired under oxidizing, reducing and again re-oxidizing conditions to achieve the lustrous surface. B. K. Thapar[2] also hints that the peeling of the slip indicate that pots may have been fired more than once. But his analysis was again confined to only standard variety of NBP having black colour and lustrous body.

The analysis of the Archaeological Laboratory of the Banaras Hindu University carried out by H. C. Bhardwaj[3], suggest that "black colour of the slip is materially on account of carbon and our experiments and observations do not substantiate the presence of magnetite or ferrous silicate. Views of Lal mentioning the use of organic which will deposit carbon on charring need attention. However, in view of the presence of a detachable clayey slip, post firing application of organic liquids looks doubtful. This slip might have been obtained by the application of well levigated emulsion of refined clay and organic liquids (say plant juices) over the dried pots. After the slip was dry, the pots were fired under reducing condition. The organic matter in the slip carbonized, without burning out, resulting in a uniform lustrous black surface".

Let it be stated in the beginning that in this case also only black and lustrous variety of NBP has been examined which Bhardwaj himself admits in his note. His view that black colour of the slip is due to carbon more or less tallies with the views of Sana Ullah and B.B. Lal who also mean that the presence of carbon in one way or other was responsible for the black colour of the pots. Lucas[4] also felt that black colour on the pottery is due to carbon.

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1. G. M. A. Richter, in *Journal British School at Athens*, XLVI, (1951), pp. 143-50.
2. B. K. Thapar, in *Ancient India*, nos. 10 and 11, p. 51.
3. H. C. Bhardwaj, in *Potteries in Ancient India,* (Patna, 1969), pp. 188-192.
4. Although Lucas did not examine NBP, but his above observation regarding black colour is based on the experiment which he conducted on Egyptian (including Nubian) black topped pottery. This black topped pottery, though early in date, is similar to our black-and-red ware of India. The technique adopted in giving two colour-effect (black and red) and in the manufacture of this black topped ware was studied also by several scholars like Flinders Petrie, W.B. Pollard, and Gordon Childe. It will be pertinent here to give their opinion on the black colour of the pottery. Flinders Petrie (W.M.F. Petrie, *Arts and Crafts of Ancient Egypt*, p. 130) thinks that black colour is due to black oxide of iron while Pollard (W.B. Pollard, *Cairo Science Journal*, IV (1912), pp. 72-75) is of the view that black colour could not be due to ferrous oxide. Gordon Childe (*Ancient Egyptian Materials and Industries*, pp. 377-381) said that attribution of black colour in pottery including Egyptian ware, only due to carbon is not justified. Lucas, however, conducted further work and in support of his views above, further said that the pottery made from grey-burnished clay, without any coating of red-ochre, where there was no red oxide of iron to be reduced might be blackened by carbon in a manner similar to that of the Egyptian ware. The black-and-red ware of India has been analysed by Plenderleith (H.J. Plenderleith, 1930, *Man*, Vol. XXX, October No. 138) and G.G. Majumdar of Deccan College, but does not need a detail treatment as they have no relevance in the present context.

But Bhardwaj experiments do not substantiate the presence of ferrous silicate and magnetite in the slip as found by Sana Ullah and Hegde respectively. Hegde's claim that due to the detachable nature of the slip the pots were fired more than once also looks doubtful to Bhardwaj.

Our[1] investigation carried out in the laboratory of the Department of Silicate Technology, Banaras Hindu University in 1971 is reproduced below :

For a comparative study, a glaze ware, an ordinary black painted ware, graphite coated terracotta ware and NBP sherds from Rajghat ware subjected to preliminary testing as given in the table below :

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[1] The work was done by the present author under the guidance and help of Prof. H.N. Roy, Dr. D.K. Patwardhan and Dr. V.C. Joshi, members of the Department of Silicate Technology, B.H.U. The author is grateful to all of them.

TABLE 6

PRELIMINARY TESTS FOR GLAZES OR ENAMELS WARE, PAINTED WARE, GRAPHITE COATED WARE AND NBP FROM RAJGHAT

Materials Tested	Hardness	Effect of				Appearance under a magnifying lens	Remarks
		Water	Kerosene oil	Hydrofluouric acid	Blast burner Flame		
Vitreous Glaze or Enamel	Not scratched by knife	Impervious	No action	Soluble	Softens	Smooth, glossy and uniform surface	
Ordinary Painted Ware	Scratched by knife	Impervious	No action	Soluble	Burns rapidly	Smooth and glossy surface which is not very even	
Graphite Coated Ware	Scratched by knife	Shows permeability to water after long standing	No action	No action	Gets oxidised with prolonged heating	Dull and shining black patches with not very uniform surface	The black colour stains the fingers on rubbing
NBP from Rajghat	Scratched by knife	Impervious	No action	Soluble & the polish comes off in thin flakes	Burns easily and the black colour changes to grey dull red	Exhibits black colour with a metallic sheen and with a more uniform surface than graphite coated wares but not so smooth as in the case of vitreous glazes and enamels.	

INFERENCES

1. Hardness is an effect of temperature and structure of the body.
2. All these wares are impervious to water.
3. Ordinary painted ware alone is acted upon by kerosene showing that other types under investigation do not contain any material soluble in kerosene.
4. Hydrofluoric acid readily acts on vitreous glazed ware and NBP sherds. In the latter case the slip being carbonaceous is not acted upon by hydrofluoric acid but thin flakes of the slip get detached or separated from the body clay.
5. A vitreous glaze or enamel is quite different both in composition and structure and also in appearance as compared with the NBP sherds.

EFFECT OF HEAT

The NBP sherds when subjected to heating in an electric furnace for 1000^{0}C lost all their black colour and polish and became red. The surface also showed in some sherds that the polish that was given to the ware did contain some fusible material like borax etc. In some of the fired pieces, the surface showed some slightly coloured surface indicating the presence of some colouring metallic oxide like copper or iron which may have been added in a very small proportion. In some sherds, the surface showed bloating of the body showing that some very fusible flux got into it as an impurity and on the subsequent firing, it fused into a slag giving bloating to the pieces.

REPRODUCTION OF NBP

Fine levigated clay from Varanasi water works was taken. The wares were made out of it. After making the pieces on the potter's wheel, the pots were fattled, cleaned and dried. The dried pots were given a smear or dip containing a temperature fusible clay with little soda or borax and a little portion of colouring metallic oxide e. g. Fe or Cu or even both. After this the 'Kabiz'[1] was applied over the pots. The wares after the application of 'Kabiz'[1] were

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[1] **'Recipe of 'Kabiz' or slip :**

Kabiz	...	1 seer
Bark of green mango trees	...	6 chataks
Soda-ash	...	2 tolas
Green Babul tree leaves	...	1 tola
Kathha	...	2 tolas

The above ingredients were mixed with suitable amount of water and pounded together and left for a couple of days. They were again pounded and mixed thoroughly with some more water. The pounded bark and the leaves are carefully removed and the whole 'Kabiz' slurry was seived and was ready for use.

fired in big earthen pots containing rick husk. The mouth of the pots were closed so as to ensure complete reducing condition and then the pots were fired in the ordinary potter's kiln. After firing the wares got the black shining appearance almost similar to that of NBP.

CONCLUSION :

The black polish or slip is the result of (1) reducing fire (2) the fineness of the 'Kabiz' or slip and the iron oxide added to it, and (3) the degree of heat *i.e.* the temperature. While the first two conditions are essential for the black polish, the temperature determines whether it would be matt, glossy or glossy with metallic sheen. It also determines the hardness of the ware. Thus the ware which has received the lowest temperature is soft and has a matt surface. The ware which has received a higher temperature is glossy and hard but the ware which has received the highest fire is the hardest and has a metallic sheen on it. The degree of heat given to the ware can also be broadly determined from the sound it gives when struck. Those pieces having a metallic sheen give a sharp note. Those pieces having a matt appearance give a comparatively softer note.

The views expressed by all these scholars on the investigations carried out by them, are at variance with each other. Secondly all the experiments were confined to only one variety of NBP having black colour and lustrous finish. The concept of standard NBP has now changed. There are other fabrics also which come under the fold of NBP. Unless some work on other varieties of NBP and more comprehensive work on the standard type or top-graded or our Fabric A[1] is done, the picture on the whole is more or less incomplete.

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[1] The pottery coming under the fold of NBP was divided into Monochrome and Bichrome NBP. Monochrome NBP was characterized by five fabrics, levelled for the sake of convenience, as Fabric A to E. The distinctive features of each fabric have been given in detail *(Supra)* and need not be retraversed here. Suffice it to mention that among these, Fabric A, which is easily distinguishable from the other fabrics due to its highly lustrous black surface (standard or top-graded NBP), has only been examined by the above investigators including even myself.

6

Material Culture of the PGW, Early NBP and Late NBP Periods-III

1. BEADS

BEADS FROM PGW AND EARLY NBP PHASES

Terracotta :

Out of one hundred and sixteen terracotta beads from different periods of Hastinapura only two from the PGW phase (late level of Period II) are illustrated. The shapes are the standard vase-shaped or *ghata*-shaped circular and short-blunt edged bicone circular[1]. These two types with their variants have been frequently reported and seen[2] from the PGW phase of Allahapur, Atranjikhera[3], Hulas, Ropar, Noh and Thapli in Tehri Garhwal. It was observed that several beads from Allahapur and Noh were also grey in colour. Out of these two varieties the commonest shape of the PGW phase is the vase-shaped or *ghata*-shaped circular. However, this shape was also found in other periods of Hastinapura except Period I (OCP deposit).

Vase-shaped or *ghata*-shaped circular beads are also reported from the Early Phase of

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1. *Ancient India* , nos. 10 and 11, Plate LVI, Numbers 41 and 38, p. 95.
2. Our own observation.
3. In the PGW phase at Atranjikhera one hundred sixty three terracotta beads are found (26 beads from the lower levels, 11 from the mid-level and 126 from the upper levels of the PGW deposit). But their shapes are not known. Information obtained from M.D.N. Sahi.

NBP of Sravasti[1] (Period I), Kausambi[2], Vaisali[3] (Sub-period IA) and Ahichchhatra[4]. This variety of bead is also found in the comparable levels (from 800 B.C. onwards *i.e.* from Sub-period IA) from Rajghat and Prahladpur[5]. The excavations at Rajghat yielded 1522 beads of terracotta. Out of this, ninety three come from Period I datable from 800 B.C. to *circa* 300 B.C. The common shape of Period I was the vase-shaped or *ghata*-shaped beads[6]. However this shape which was fairly common in the Early Phase of NBP continued to occur in the succeding periods of Rajghat.

Agate :

This material is represented at Hastinapura by seventeen beads. The common shape is the barrel circular which is found in all the periods except Period I. But the popular shape of the PGW levels was long barrel circular with beautiful bands (HST., Fig. 29, Nos. 25 and 26, and Pl. LV, Nos. 25 and 26). These banded agate beads in which the stone was cut in such a manner so that the bands produce various designs as chevron, 'eye' and zones are also common in the Early Phase of NBP at Sravasti, Rajghat, Kausambi, Prahladpur and Ahichchhatra[7]. The most popular shape is the long barrel circular.

Carnelian :

Among seventeen carnelian beads at Hastinapura, the common shape is spherical which occurs in all periods except Period I. The other shape represented in the PGW phase is the short bicone triangular faceted. Carnelian beads are also reported from the PGW phase at Khalaua, Allahapur and Sardargarh but due to lack of details, their exact shapes

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1. K.K. Sinha, *Excavations at Sravasti*, 1959, (Varanasi, 1967), p. 61, Figure 19, No. 60.
2. G.R. Sharma, Excavations at Kausambi, 1949-50, *Memoirs of the Archaeological Survey of India*, no. 74, (Delhi; 1969), pp. 119-21. At this site these are reported from *circa* 500 B.C. upwards.
3. *Vaisali Excavations*, 1950, (Vaisali, 1961), p. 63.
4. These are reported from Plots Nos. ACG, 19-30 m in ACXV, 18.66 m. See, *Ancient India*, no. 8, pp. 62-63.
5. A.K. Narain and T.N. Roy, *The Excavations at Prahladpur*, 1963, (Varanasi, 1968), p. 47, pl. XIX, nos. 1 and 2.
6. A.K. Narain and P. Singh, *Excavations at Rajghat*, Part III, (Varanasi, 1977), pp. 48-49.
7. Bead No. 8, which is long barrel circular and decorated with Dikshit Pattern 14, has not been assigned any stratum. But from the reported depth of ± 24 m., which is maximum so far in case of Ahichchhatra beads, it can be presumed that it was from the earliest level of the site *i.e.* from the Early Phase of NBP. See, *Ancient India*, no. 8, p. 35.

are not known. The spherical type of bead of the PGW phase at Hastinapura is also common in the Early Phase of NBP at Rajghat and Prahladpur. But in the Early Phase of NBP at Sravasti we have some more types such as long barrel flattened hexagonal, long cylinder square, standard barrel circular and long cylinder irregular square. Out of these varieties long barrel circular and standard barrel circular beads were fairly common at Rajghat.

Bone :

Out of total of three bone beads found at Hastinapura only one[1], the standard barrel gadrooned is from the PGW phase. Bone beads are also reported from the Early Phase of NBP at Sravasti but none are illustrated. From comparable levels of Prahladpur the one illustrated is long barrel oval. Out of the total of seventeen beads of bone from Rajghat, four come from the comparable level *i. e.* from Sub-periods IA and IB. The types are spherical standard cylinder and circular tabulor.

Glass :

Glass accounts for eighteen beads at Hastinapura but only one is found from the PGW phase. Glass beads are also reported from the PGW phase of Alamgirpur and Allahapur, but from none of these sites the details or the illustration of these beads is available. The most interesting specimens are two 'eye' beds of stratified glass recovered from the lowermost levels of the Early Phase of NBP (Period I) at Sravasti. In one case there are eight 'eye' while in other case there are three 'eyes' (SRV., Fig 18, Nos. 12 and 13). The third bead with seven 'eye' was a surface find. This type was also reported[2] from the Early phase of NBP of Bhir Mound, Taxila. The other two varieties reported from Sravasti are standard irregular bicone diamond and vase-shaped. Both these are green in colour. A standard spherical type glass bead is reported from the comparable levels of Prahladpur (PLP., Fig. 18, No. 16). Out of the total of three hundred sixty seven glass beads recorded from different periods of Rajghat, eighteen are from the various sub-periods of Period I. In fact, they represent the second largest group after terracotta beads. The popular shape from the comparable strata (*i.e.* from Sub-periods IA and IB) is the standard spherical. The glass beads from the lower strata (Pre-structural phase II) of Kausambi are few but they are generally of better quality than in upper strata. From Ahichchhatra bead number 124 is also spherical and is of black glass. It is found in AC III, Stratum IX assignable now to the Early Phase of NBP.

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[1] The text of Hastinapura report in *Ancient India*, nos. 10 and 11, page 92 mentions that only one, type of bone bead, the standard barrel gadrooned, is found from the PGW phase. But the description of the illustrated beads on page number 94 contains one more type, the spheroid bead (Number 2) which was also recovered from the PGW phase of the site. Roughly similar type of beads (spherical) are also reported from the comparable levels of Rajghat.

[2] Two 'eye' beads of black glass are also reported from Rajghat but they are from Period III.

Jasper :

A red jasper bead in toggle-shaped has been illustrated from the PGW phase of Hastinapura (HST., Fig. 29, No. 27). This material was represented at Sravasti in the Early Phase of NBP (Period I), by also only one bead with truncated bicone circular type. A black-jasper bead with white lines comes from Allahapur. At Prahladpur the colour is green and the shape is long convex circular (PLP., Fig. 18, No. 20). Out of fifteen beads o jasper from different levels of Rajghat, three are red and the remaining twelve are green. But in the comparable levels the most common shape was the long barrel circular and the favourite colour was green.

Chalcedony :

Spherical and barrel shaped beads of this material are found in the PGW phase of Sardargarh. From the Early Phase of NBP, one spherical and two standard cylinder circular are reported from Rajghat.

Copper :

Two copper beads are reported from Hastinapura (PGW phase) but none are illustrated. From Sravasti (Early Phase of NBP), the shapes illustrated are standard barrel circular and long cylinder circular. All the three beads of copper from Rajghat belong to Sub-period IA and their shapes are exactly similar to that of Sravasti Early Phase of NBP specimens. Standard barrel circular is represented by one specimen and long cylinder circular by two specimens.

Shell : - Literary corroboration

This material is represented at Sravasti (Early Phase of NBP) by a dagger pendant and a long barrel hexagonal bead (SRV., Fig. 19, Nos. 49 and 50) and at Prahladpur (Early Phase of NBP) by a long bicone barrel circular (PLP., Fig. 18, No. 27). So far we have not found shell beads in the PGW phase.

Lapis-Lazuli :

The one specimen with long cylinder pentagon comes from the Early Phase of NBP at Sravasti. Beads of long, square and rectangular shapes are found at Sardargarh PGW phase. One specimen, similar to that of Sravasti, (long cylinder in shape) also comes from Rajghat and Prahladpur (PLP., Fig. 18, No. 21) comparable levels. Lapis in an early historic contact has been also reported from Champa[1]. In the occupational sequence of the Bhir Mound of Taxila between the sixth-fifth and second centuries B.C., H. Beck has listed nineteen beads[2].

Amethyst :

The one bead of elliptical hexagonal shape comes from the Early Phase of NBP of Sravasti (SRV., Fig. 18, No. 15). Amethyst accounted for seven beads at Rajghat, out of which one comes from the Early Phase of NBP. The shape represented is that of standard bicone hexagonal. However, one bead of elliptical hexagonal shape (similar to Sravasti) was also found but that is from the unstratified level.

Topaz :

Out of the total of two specimens from Rajghat, one is from the Early Phase of NBP. Its shape is plano-convex bicone. This is of whisky-yellow colour and is different from 'false topaz' noted by Beck in the collection of beads from Taxila. It is a rare specimen in this context.

BEADS FROM THE LATE PHASE OF NBP OR THE LATE PHASE OF IRON AGE

Terracotta :

The vase-shaped or *ghata*-shaped beads of terracotta which was so common in the PGW and Early Phase of NBP continue to occur also in the Late Phase of the NBP at Hastinapura, Sravasti, Kausambi, Vaisali, Ahichchhatra, Rajghat and Prahladpur. Our study reveals that another variety of PGW and Early Phase of NBP, the short-blunt edged bicone circular, is improved and comes out in its better form, in the Late Phase of NBP, as pear-shaped or arecanut beads. Turned on a fast wheel, baked hard at high temperature and produced on a mass scale, this type is one of the commonest, being noticed on almost every site of Late Phase of NBP. The specimens at Rajghat, about 1106 (out of the total of 1,522 beads of terracotta), are extremely well baked and are generally devoid of any surface treatment. But in a few cases they are treated with black slip similar to that of NBP. The perforations are generally very regular and large and the apex is truncated. These are reported for the first time from Sub-period IC at Rajghat *i.e.* from the Late Phase of NBP. The specimens at Kausambi, about one hundred eighty four in number are distributed from *circa* 300 B.C. to 200 A.D. At Hastinapura and Sravasti their antiquity also could not be traced back beyond the Late Phase of NBP *i.e.* their earliest occurrence is reported from Periods III and II of Hastinapura and Sravasti respectively. Similar corroborative evidence comes from Ahichchhatra, Prakash and Taxila. At Ahichchhatra, their earliest occurrence is from

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[1] B.P. Sinha in *Man and Environment*, vol. II, (Ahmedabad, 1978), page 58.

[2] J. Marshall, *Taxila*, (Cambridge, 1951), p. 730 and 734; H. Beck, *The beads from Taxila*, (Calcutta, 1941), pp. 15-16, pls. VI and VII.

Stratum VIII upwards. At Prakash,[1] their earliest occurrence is from the overlap phase of Period II and III. At Taxila, such beads are recorded from Sirkap[2]. It is, however, not known whether they have been found at Bhir mound too. Outside the Ganga Plains at Nasik, Nevasa, Kolhapur and Brahmagiri etc., the antiquity of these beads cannot be traced beyond 200 B.C. From the foregoing evidence, it would be clear that the arecanut shaped beads had their origin in the Late Phase of NBP in the central Ganga plains around 400-300 B.C. from where it travelled to the other regions. Amongst terracotta beads of its time, it is the most predominant type and may be regarded as one of the diagnostic trait of the Late Phase of NBP.

The other interesting varieties in this phase are a moulded cylinder bead showing an impressed design formed by a double row of chevrons from Sravasti (SRV., Fig. 19, No. 61) and a long convex hexagonal bead decorated on each face with applique wavy ridge pattern design from Prahladpur (PLP., Fig. 18, No. 5).

Agate :

Banded agate beads of the PGW and Early Phase of NBP continue to occur also in this phase at Hastinapura, Sravasti, Rajghat, Kausambi, Ahichchhatra and Prahladpur. 'Eye' beads, the most common in the Early Phase of NBP, continue to occur at Sravasti. Two spherical 'eye' beads (Nos. 11 and 12) are also reported from Stratum VIII of Ahichchhatra[3] dated from 300 B.C. to 200 B.C. These are carefully polished. Leech-shaped beads reported only from the Early Phase of NBP at Sravasti are also found at Ahichchhatra. This bead from Ahichchhatra (No. 27) is oval shaped and is found from AC XV at the depth of about 20 m. This is not dated but appears to belong to Late Phase of NBP. At Taxila, a few in the Mauryan Strata in Bhir Mound and a few from Sirkap show that they continued from Mauryan levels to the early centuries of the Christian era. These are fairly distributed in the Ganga Plains being known from Rajghat, Masoan and Kausambi. At Vaisali, they occur exclusively in the Mauryan stratum. In Patna Museum, several specimens of these beads are also from the Ganga valley. D.H. Gordon collected eight leech shaped beads of carnelian and one of agate from a site called Harihara on the bank of the Karkai river in south Bihar. Marshall thinks them of Indian origin. The earliest occurrence of these beads at Sravasti in the Early Phase of NBP *(Supra)*, their reportedly occurrence in the Late Phase of NBP on the sites of the Ganga Plains and their total absence in the south point towards their origin in the Ganga Plains.

The origin of etched beads may be attributed to the people of the Late Phase of NBP. It may be pointed out that none of the etched beads are reported from either the

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1. *Ancient India*, nos. 20 and 21, p. 115.
2. A. Ghosh, *Taxila (Sirkap)*, 1944-45, *Ancient India*, no. 4, (New Delhi, July 1947—Jan., 1948), pp. 33-35, Pl. XI.
3. *Ancient India*, no. 8, pp. 37-39, Fig. 1, Nos. 11 and 12.

Early Phase of NBP or PGW phase. The earliest appearance of the etched beads of agate is reported from Hastinapura, Period III, Sravasti, Period II, Ahichchhatra, Stratum VIII dated from 300 B.C to 200 B.C. and Kausambi dated round about 150 B.C. *i.e.* all from the Late Phase of NBP. In a later context of the same phase, these are reported from Rajghat, Taxila, Nasik, Tripuri, Bahal, Kondapur and Maski. All of these are of black agate and the etching is done in white in order to offer a contrasting effect. Since in point of time the earliest specimens are from the Late Phase of NBP and also they are widely distributed in the Ganga Plains, it will not be unreasonable to regard them as the guide-fossil of the Late Phase of NBP.

Another individualistic type of this phase is a toggle bead reported from Hastinapura

Carnelian :

These beads, in this phase, show a range of variety in form. The shapes found are long convex pentagonal (Hastinapura); spherical, spacer crescent shaped, dagger-pendant, standard bicone hexagonal (Sravasti); short barrel circular, spherical, leech-shaped lenticular, dagger-pendant (Ahichchhatra); spherical, square, animal pendant (Kausambi); short barrel circular, pyramid-shaped (Rajghat); diamond-shaped, tabular triangular pendant (Vaisali). At Prakash[1] five chevron shaped beads were recovered in one lump. These beads are also reported at Bahal, Ujjain, Sohagaura and Sonepur but their shapes are not known. At Nevasa the most common shape was spherical (13 beads) and tablet (5 beads). One was also barrel in shape.

Besides above the emergence of etched beads of carnelian may be attributed to this phase. In point of time, the earliest specimen is from Rajghat, the early levels of Late Phase of NBP. From comparable levels they are also reported from Kausambi, Vaisali, Ahichchhatra, Mathura and Taxila. From post-NBP Phase these are also reported at several other sites which need not draw our attention at this stage.

Bone :

They continue to occur at Hastinapura, Sravasti and Rajghat. But the common shape in this phase is spherical. This shape is reported from Hastinapura, Sravasti, Rajghat and Kausambi. The other shapes reported are standard bicone circular lug collared from Sravasti (SRV., Fig. 19, No. 55) and collared barrel-shaped with incisations that leave a rope design in relief from Nasik[2]. A bead of bone of long barrel circular shape is also reported from Prakash.

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[1] *Ancient India*, nos. 20 and 21, p. 115, Fig. 37, No. 30.

[2] H. D. Sankalia and S. B. Deo, *Report on the Excavations at Nasik and Jorwe*, 1950-51, (Poona 1955), p. 87, Fig. 46, No. 4.

Glass :

In this phase the types in the glass beads become more varied. At Rajghat and Kausambi, nearly all the beads seem to be of local manufacture as evidenced by a large number of unfinished and unbored specimens. At Kausambi, the wound beads constitute nearly half the total of five hundred and ten. At Rajghat, this is second largest group after terracotta. Out of the total of eighteen glass beads from Hastinapura, ten are from Period III *i.e.* from the Late Phase of NBP. The glass in this phase is generally not so fine as it was in the Early Phase of NBP. This is probably due to mass production. Although the production was increased but the people had predilection for the ealy shape. So the common type in this phase was also spherical, (this shape was also common in the Early Phase of NBP). Other varieties reported are, standard truncated bicone diamond (Hastinapura); barrel circular (Sravasti, Prahladpur and Vaisali); and elliptical circular and small barrel lenticular (Ahichchhatra). An interesting example is a spiral bead of staratified glass wherein a thread of white glass was wound round the black. This variety is reported from Sravasti (SRV., Fig. 19, No. 41) and Vaisali. Glass beads are aiso reported from Mathura, Prakash, Nasik and Sonepur but their shapes are not available. At Nevasa the shapes are very varied. Noteworthy are two beads of glass with gold foil put in between two layers of blue and white glass. Etching of glass beads also started in this phase. The only example available comes from Hastinapur (HST., Fig. 29, No. 4).

Jasper :

Beads of jasper were not very common. It is interesting to note that these beads were also rare in the PGW and Eaıly Phase of NBP. Out of the total of nine from Nasik, seven are reported from the Late Phase of NBP. The shapes are globular of green colour (NSK., Fig. 46, No. 7), truncated barrel of green colour (NSK., Fig. 46, No. 3), globular having a fine black line on the red body (NSK., Fig. 46, No. 9) and the remaining four (not illustrated) are also globulur in shape. Out of the total of seven specimens from Kausambi, one of spherical red colour comes from the strata dated round about 300 B.C. Jasper beads are also known from Ujjain and Broach but their shapes are not reported.

Copper :

Copper beads continue to occur also in this phase at Hastinapura, Sravasti and Rajghat but their number and shape have become restricted. The only shape available at Sravasti is the standard cylinder square. Out of the total of four beads at Kausambi, only the spherical one comes from the strata dated round 300 B.C. Such spherical or coiled beads of copper are also reported at Ahichchhatra but it is doubtful whether they were used as beads or ear-plugs. In the Late Phase of the NBP, beads of copper were also in use at Ujjain.

Shell :

Shell beads continued at Sravasti but an interesting find at this site was a shell disc bead having four circlets design (SRV., Fig. 19, No. 47). Apart from this, shell beads are also reported from Nasik, Mathura and Nevasa. At Nevasa, the shapes reported are globular, toggle, tablet, short cylinder, collared tablet barrel and flat and big barrel.

Lapis lazuli :

This material has been reported at Nasik[1] and Nevasa, at each by two specimens. The shapes at Nasik are long cylindrical and a square cylinder having navy blue patches over a greyish surface. At Nevasa, the shapes are square cylinder and tablet. In the excavated levels of Sirkap (mainly first century B.C.),[2] some beads are reported. Its scarcity may be due to the fact that the stone was not locally available in India and had to be imported. These beads were also rarely reported in the PGW and Early NBP Phases.

Chalcedony :

Beads of chalcedony continue to occur at Rajghat and shapes are spherical and standard cylinder circular. Spherical beads are also found at Ahichchhatra. Beads of chalcedony are also reported from Patna (Mauryan levels), Kausambi (200 B.C. levels), Broach and Ujjain (Late NBP levels).

Paste :

So far only one bead of paste is reported from Nevasa[3]. Its shape is not known.

Crystal :

Beads of crystal continued to occur at Prakash and Rajghat. But at Hastinapura, Sravasti, Mathura, Bahal, Vaisali, Sonepur, Nasik, Ujjain and Nevasa they appear for the first time only in the Late Phase of NBP. The shapes found at Hastinapura are long barrel oval, long bicone cylinder, septagonal, long convex hexagonal, long barrel hexagonal and long convex circular. At Sravasti, the shapes are faceted double pentagon twisted and spherical (SRV., Fig. 19, Nos. 33 and 36) At Nasik, the common shapes are biconical hexagonal and spherical. A crystal human face with exotic features and horizontal perforations on bead indicating its use as pendant is reported from Sonepur[1]. A long cylinder square bead of crystal is also found at Rajghat. At Nevasa, the shape is truncated barrel.

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[1] *Report on the Excavations at Nasik and Jorwe*, 1950-51, (Poona, 1955), pp. 89-90, Fig. 45, Nos. 11 and 12.

[2] *Taxila*, p. 506, Pls., 142 and 203.

[3] *Indian Archaeology*, 1954-55, *A Review*, (1955), p. 7.

Thus it shows that crystal beads were common in this phase.

Amethyst :

These beads continue at Sravasti but are absent at Rajghat. From this phase, these are reported at Hastinapura (short truncated convex hexagonal), Ahichchhatra[2] (long barrel elliptical), Nasik[3] (ovoid shape) and Nevasa (globular). Ujjain also yielded amethyst beads from this level, but the shape is not known.

BESIDE THE ABOVE THE FOLLOWING MATERIALS ARE ONLY REPORTED IN THE LATE PHASE OF NBP. THEY WERE NOT AVAILABLE IN EITHER THE PGW OR THE EARLY PHASE OF NBP.

Quartz :

Out of the four beads of yellow quartz from Ahichchhatra,[4] two are from AC III, Stratum VIII dated from 300-200 B.C. and the remaining two are unstratified. Among the stratified ones, one is a long barrel hexagonal with alternating large and small facets while the second is a drop pendant. Such beads are also reported in the Mauryan strata at Tripuri. At Taxila, their earliest occurrence is from 300 B.C. upwards. Out of the total of fifteen beads from Nasik, fourteen come from layers of Period II. The shapes reported are biconical hexagonal, pointed pentagonal bicone, double pentagonal and biconical with intermediate facets. The noteworthy features are its finish, the use of several colours and its shape which is twisted pentagon.

Onyx :

This material is represented by a single bead of long cylinder circular shape at Hastinapura (HST., Fig. 29, No. 12) and a single bead at Ujjain, whose shape is not known.

Opal :

All the three beads at Nasik belong to this phase. One specimen is a drop pendant (NSK., Fig. 45, No. 15). It is perforated at the top, having opalescent and milky base,

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1. *Indian Archaeology*, 1961-62, *A Review*, (1951), p. 4, pl. IV A.
2. *Ancient India*, no. 8, p. 48, Fig. 3, no. 75.
3. H.D. Sankalia and S.B. Deo, *Report On the Excavations at Nasik and Jorwe*, 1950-51, (Poona, 1955), p. 87, figure 46, no. 6.
4. *Ancient India*, no. 8, p. 47.

both the top and the base are flat. The other two are beads of twisted pentagons with perfect facets.

Bloodstone :

Two beads are reported at Nasik[1]. The shape of the first was truncated biconical of blackish-olive-green colour with several bright blood-red and greyish-white dots. The second bead is of barrel shape. One spherical bead is also reported from Nevasa. Bloodstone bead is also reported from Ujjain.

Ivory :

Beads of ivory are reported from Sonepur[2] and Ujjain[3] but shapes are not known. At Rajghat, one bead of standard truncated bicone comes from Sub-period IC *i.e.* from the Late Phase of NBP.

Marble :

A spherical bead is reported from Vaisali[4].

Steatite :

A fragment of a steatite amulet showing on the obverse three circles, each enclosing three symbols, out of which an animal stands on the top, a bird on the right and a square on the left with possibly a fish inside, is reported from Rajgir[5]. On the reverse are three verticle lines. Five beads reported from Nevasa are of tiny globular shape.

Soapstone :

One bead is reported from Nasik and one from Ujjain. Nasik one is double-pentagon of blackish ash coloured soapstone. It is smooth, polished and well faceted. The type of Ujjain specimen is not known. But the Nevasa beads (two) are irregular globular shaped.

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1. Sankalia and S.B. Deo, *Report on the Excavations at Nasik* and Jorwe, 1950-51, (Poona, 1955), p. 87, Fig. 45, Nos. 9 and 10.
2. *I.A.*, 1956-57, p. 19.
3. *I.A.*, 1957-58, p. 36.
4. *Vaisali Excavations*, p. 63.
5. *I.A.*, 1961-62, p. 7, Pl XIIA.

Gold :

One gold bead of human shape is reported from Ujjain[1]. The other which is heavily crushed comes from Kausambi[2], Sub-period IA, dated to about 300 B.C. The metal when tested on the touchstone showed about two per cent alloy of silver. Small repousse circular elevation at one end of the bead and the rounded outline at the terminal show that it was probably a cylinder bead (KSB., Pl. LXIII, No. 78).

Coral :

Out of the total of twenty eight beads at Rajghat, three come from the late levels of Period I. The shapes are very simple and include spheroid and circular standard cylinder. These beads are comparatively rare in India. However, these are recorded from Nevasa[3] (Early Historical levels), Taxila[4] (Early Historical levels), Maski[5] (Chalcolithic levels) and Ujjain (NBP levels). Coral beads from Rajghat share common features with those of the above three sites. It has been mentioned at Maski that the material was brought from the Indian seas. In the Late Phase of the NBP, Rajghat, the site of ancient Varanasi also had trade connections with distant places and it can be inferred that this was brought to Rajghat by way of trade.

Faience :

A long barrel circular shape bead is found at Rajghat. From the comparable levels these beads are also reported at Ujjain[6] and Nevasa[7]. Although faience beads have been reported from Taxila[8], Charsada[9], Hastinapura[10], Ahichchhatra[11], and Kausambi[12], but none of them could be dated earlier than the beginning of the Christian era. On the other hand, the material was extensively used in Harappan times. In central India and northern Deccan

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1. *I. A.*, 1957-58, p. 36.
2. *Excavations at Kausambi*, 1949-59, (Delhi, 1969). p. 113, Pl. LXIII, No. 78.
3. *Sankalia, et. al.; From History to Pre-history at Nevasa*, (Poona, 1960), p. 351, Fig. 166, No. 15. This is a triangular pendant in its natural state.
4. H.C. Beck, 'Beads from Taxila', *MASI*, No. 65, p. 33, Pl X, 31-32.
5. B.K. Thapar, Maski, 1954 : A Chalcolithic Site of the Southern Deccan, *Ancient India*, no. 13, (New Delhi, 1957), p. 105, Pl. XXVII, 3, 5, 13 and 22.
6. N.R. Banerjee, *The Iron Age in India*, (Delhi, 1965), p. 202.
7. *I.A.* 1954-55, p. 7.
8. H.C. Beck, *MASI*, No. 65, p. 31, Pl. X, Nos. 1-7.
9. *An. Rep. Arch. Surv. Ind.*, 1902-03, (Calcutta, 1904), Pl. XXVII, 3.
10. *Ancient India*, nos. 10 and 11, p. 92, Fig. 29, 14.
11. M.G. Dikshit, *Ancient India*, no. 8, p. 51, Fig. 4, Nos. 84-92.
12. Dikshit, *Ibid.*, p. 51.

especially at Navdatoli[1] and Nevasa,[2] these beads have been reported from chalcolithic levels. So up till now it was held, that these were not known in the intervening period lying between the chalcolithic and the beginning of the Christian era. The material seems to have lost its value with the extensive use of glass. But now with the discovery of these beads in the Late Phase of NBP on the above sites, this opinion needs revision. The revival of the use of the beads during Mauryan time may be due to the known cultural relation of India with Persia during Mauryan Period.

BEAD INDUSTRY IN THE LATE PHASE OF NBP

So far we have not been able to trace the remains of any bead industry in the PGW or Early Phase of NBP. But in the Late Phase of NBP, however, there are some indications of the industry being found at Broach, Jaugada, Ujjain, Kausambi and Rajghat.

"The bead industry at Broach should deserve special mention, since beads were found in large quantities and in all stages of fabrication, the shapes being spherical, barrel, triangular sectioned and disc".[3] The evidence at Jaugada is also interesting, "Among other industries special mention may be made of bead making : a large number of beads, made of shell bone, carnelian, agate, crystal, quartz, etc. were remarkable for their workmanship. From the presence of unfinished beads it was clear that they had been manufactured locally"[4].

At Ujjain large number[5] of unfinished agate beads of various shapes and sizes indicate that the bead was manufactured locally. The find of standstone grinding slab marked by deep and long grooves and several long and deep channel furnaces evidently used for heating beads[6] are also the remains of the bead industry. According to Periplus, Ujjain was a centre from where semi-precious stones were exported to the west via Broach.

At Kausambi, nearly five hundred and ten glass beads were recovered from different strata. The wound beads constitute nearly half the total. According to Dikshit who studied these beads, nearly all the beads seem to be of local manufacture, as evidenced by a large number of unfinished and unbored specimens. But it is not certain whether the industry existed during this phase or not.

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[1] H.D. Sankalia, et. al., *The Excavations at Maheshwar and Navdatoli*, 1952-53, (Poona-Baroda, 1958), p. 179, Fig. 131.

[2] Sankalia, et. al., *From History to Pre-history at Nevasa*, (Poona, 1960), p. 351, Fig. 167, Nos. 3-17.

[3] *I.A.*, 1959-60, p. 19.

[4] *I.A.*, 1956-57, p. 30.

[5] *I.A.*, 1956-57, p. 27, Pl. XXXIIIB.

[6] *I.A.*, 1957-58, p. 34, Pl. XLII A.

Among the total of two thousand four hundred and seventy two beads that have been reported at Rajghat, some were found in an unfinished stage. For instance, among the largest group of terracotta beads, numbering one thousand five hundred and twenty two, several are incompletely perforated and finished. In the second largest group of glass beads, numbering three hundred and sixty seven, several are half-perforated. Similar is the case with the third largest group of agate beads, numbering one hundred and thirty eight. This possibility becomes almost a certainty in the case of the last two materials as they are found with several pieces of glass slags and agate chunks. Even then, the absence of any remains of an industry, the various equipments like moulds[1] etc. and the lack of the evidence of the various stages of the manufacture, leaves us in doubt whether Rajghat was a bead making centre during the Late Phase of NBP ? The large number of beads and the various categories of materials speak without any doubt that they were used extensively as a decorative item of every day use at Rajghat.

2. TERRACOTTA FIGURINES

TERRACOTTA HUMAN FIGURINE FROM THE PGW AND EARLY PHASE OF NBP :

We have no evidence of any human figurines from the PGW level of Hastinapura. But now three human figurines from the PGW phase at Jakhera and two hand made human figurines from the PGW phase at Atranjikhera[2] are known to us. The details of Atranjikhera figurines is not known. Jakhera figurines on personal examination can be placed roughly under the common nomenclature of the "Mother goddess". From the late levels of Sub-period IA (dated from 800 B.C. to 600 B.C.) from Rajghat, we have also a single specimen of a hand-modelled archaic Mother-goddess[3]. This specimen is red in colour and is characterised by broad hips and thighs, an applied girdle decorated with a row of punched circlet design, thin waist, stump-like left leg with marks of fingers shown by making incisations. The navel is indicated by making a punched circlet design. The head, arms and right leg are broken. From the Early Phase of NBP (overlap phase of PGW and NBP) a human head has been reported from Khalaua[4]. From *circa* fifth century B.C. to *circa* third century B.C , these female deities in one form or other have been reported from Kausambi, Rajghat, Pataliputra and Prahladpur. Several types could be marked in them. One group consists of figurines in grey, NBP and dull red colour bordering on grey. A tenon like thing springs from the neck on which perhaps the head of figurine was once fitted. This device permitted the heads to swing from side to side. These are reported from Kausambi (three specimens)[1], Prahladpur (one specimen)[2] and Rajghat (one specimen)[3]. In another group the modeller invariably made use of applique technique. Different parts of the body were made by joining together a number of separately prepared pieces. As the Pataliputra specimens show, the impressed circlets over the body were intended to indicate the eyes, the breasts and the navel. This group is mainly represented at Kausambi[4] and Pataliputra[5].

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[1] A mould for making beads was found at Rajghat but it was from Period III. See, *I.A.*, 1963-64, p. 59, Pl. XXXIX B.

[2] *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 47.

[3] This Rajghat type of Mother-goddess figurine is different from the Jakhera specimens. But broady both these types come under the vague and ageless category of the 'Mother goddess'.

[4] *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 42.

TERRACOTTA HUMAN FIGURINES FROM THE LATE PHASE OF NBP

When we come to the Late Phase of NBP, we start getting several images which can be categorised, mainly under the following types :

(1) Mother-Goddess :

The characteristic feature of the type is the bird or animal like face, prominent breasts, broad hips, thin waist and adorned freely by applied and punched decoration. These archaic figures, in being hand-modelled and some grey in colour, conform to a predetermined .iconographic pattern of the Mother goddess of the early phase but with a marked difference The applique and the punched mode was purely decorative and was applied freely and with variation. From the popularity of these figures in this phase and with a pre-determined iconographic formula at the back, the inference is irresistible that they preserve an earlier tradition. These types have been recovered from Ahichchhatra[6] Stratum VIII (dated *circa* 300 B.C. to 200 B.C.), Hastinapura[7] Period III, Sravasti[8] Period II, Rajghat[9] Sub-period IC, Vaisali[10] (*circa* 150 B.C.), Mathura[11] NBP phase and Ujjain[12] Period II.

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1. G. R. Sharma, *The Excavations at Kausambi*, 1957-58, (Allahabad, 1960), p. 74, Pl. 44, Nos. 1, 2 and 3.
2. A. K. Narain and T. N. Roy, *The Excavations at Prahladpur*, 1963, (Varanasi, 1968), p. 45, pl. XV, No. 3.
3. A. K. Narain and T. N. Roy, *Excavations at Rajghat*, Part I, 1957-58- 1960-65, (Varanasi, 1976), p. 24.
4. G.R. Sharma, *op. cit.*, pp. 75-76, pl. 44, Nos. 4, 5 and 6.
5. *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 41, pl. X, Nos. 1, 2, 3, and 4.
6. V.S., Agrawala, 'Terracotta Figurines of Ahichchhatra', *A. I.*, no. 4, 1947-48, pp. 106-107, pl. XXXI A.
7. K.K. Sinha, in *A. I.*, nos. 10 and 11, p. 84, pl. XXXVI, No. 4.
8. K.K., Sinha, *Excavations at Sravasti*, 1959, (Varanasi, 1967), p. 52 and 54, pl. XIV, No. 6.
9. Our own observation.
10. *I.A.*, 1954-55, p. 15.
11. *I.A.*, 1954-55, p. 15.
12. *I.A.*, 1957-58, p. 36.

(ii) In this group comes the figurines, both male and female produced generally by a single mould. Some of the specimens in this category are also grey while the others are red. The whole group consists of couples of the Mithuna and Dampati types and allied male and female figures. The representation in these cases in conceptual[1] rather than realistic and they share in dress, ornaments and decorations with the contemporary art in stone (2nd-Ist century B.C.). These types have been reported from Sunga and Panchala Periods of Ahichchhatra[2]; middle and upper levels of Period II of Sravasti[3]; Hastinapura[4] Period III; from *circa* 255 B.C. to *circa* 25 A.D. at Kausambi[5]; from the mid and upper levels of Period I at Pataliputra[6] and Rajghat Sub-period IC and Period II. Such allied figurines of male or female are also reported from Ujjain, Mathura, Jajmau, Rajgir, Sonepur, Chandraketugarh and Vaisali, but their details are not available. At Sonepur[7], however, a figurine with a peculiar headdress and an elegant skirt was of unusual interest.

(iii) These figurines with an animal face, (goat—like features) long dangling ears with pierced holes or slit marks have been also reported from the *circa* 150 B.C. levels at Pataliputra. But they are generally concentrated in the Kushan-Gupta levels of several sites like Kumrahar, Ahichchhatra, Mathura and Rajghat. The Pataliputra[8] specimens show that these are hand-modelled and evinced lack of imagination and artistic zeal of the artist.

TERRACOTTA ANIMAL FIGURINES IN PGW AND EARLY NBP PHASES:

Animal figurines have been reported from the PGW phase at Hastinapura, Ahichchhatra, Alamgirpur, Allahapur, Bhagwanpura, Noh, Sardargarh and Atranjikhera and from the Early Phase of NBP of Takiaper, Rajghat, Prahladpur, Rajgir and Vaisali.

The occurrence of three animal figurines (a humped bull, a bull and probably a horse) from Hastinapura show that they were crudely modelled and do not show any craftsmanship in art[9]. Ahichchhatra also yielded animal figurines, though the details of the particular animal have not been reported[10]. A ram and a bull are the finds mentioned from Alamgirpur. A beautiful bird in grey comes from Noh. A bird figurine is also reported from Alla-

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1. Benjamin. Rowland, *The Art and Architecture of India*, p. 55.
2. V.S., Agrawala, *op. cit.*, pp. 109-110, pl. XXXIB and XXXII.
3. K.K., Sinha, *op. cit.*, pp. 52-53, pl. XIV, Nos. 3 and 4.
4. *A.I.*, nos. 10 and 11, p. 83, pl. XXXVI, Nos. 1 and 2.
5. G.R., Sharma, *op. cit.*, p. 74, Pls. 45 and 46.
6. *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 42, pl. XI, Nos. 1-6.
7. *I.A.*, 1961-62, p. 4, pl. IVB.
8. *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 41, pl. XIIIB.
9. *A.I.*, nos. 10 and 11, p. 86, pl. XLII.
10. *I.A.*, 1963-64, p. 43.

hapur. Occurrence of bull's figurine are reported from Early Phase of NBP of Rajghat. In Early Phase of NBP at Sravasti[1], the four illustrated specimens could not be identified but the characteristic feature of these was the presence of deep incised lines on the body. Rajgir and Vaisali specimens from comparable levels closely recall those of Sravasti. In the Early NBP Phase at Rajghat[2], the animal figurines were also of grey. The grey figures of elephants were treated with NBP slip and often decorated with punched circlets, incised lines and occasionally spotted with pink or cream or ash grey strokes. The figurines of elephant and horse often made in NBP fabric are also reported from the Early Phase of NBP at Mathura, Bhita, Buxar and Prahladpur. In the comparable levels of Sonepur, Vaisali, Buxar and Rajghat the figure of a serpent (with raised hood and elongated body) often decorated with incised lines or punched circlets are also reported.

TERRACOTTA ANIMAL FIGURINES IN THE LATE PHASE OF NBP :

In the Late Phase of NBP, the animal figurines are generally better modelled. Although all the figurines were made mostly by hand, yet they reveal craftsmanship in the art of clay modelling which was not noticeable in the specimens of the early phases.

ELEPHANTS

In this phase, the elephant figures are by far the largest in number. A favourite device of decorating the body of elephants is to cover it with circlets which are either punched, notched and stamped. Still better decoration consists of elegant *chakras*, leaves, rosettes, tree-like design and series of pierced holes enclosed within incised grooves, stamped in the body and fore head of the elephants. (HST., pl. XLIII, 4, 7, 9 and 10; SRV., pl. XVII, 10, 11 and 12). In some cases, the decoration consists of two bands one round the neck and another on the temple (KSB., pl. XLIIB, 1 and 2). The punched band round the neck probably represents a garland. It may be noted that the elephant figures including the decorative and grey specimens occur commonly at early historical sites of Ganga Plains, chiefly from Mauryan levels *i.e.* from the Late Phase of NBP. The important sites are Hastinapura[3] (Period III), Sravasti[4] (Period II), Rajghat[5] (Sub-period IC and II), Mathura[6] (mid-phase of NBP), Sonepur[7] (middle levels of NBP), Patalipulra[8] (middle level of NBP)

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1. K.K. Sinha, *Sravasti Excavations*, 1959, (Varanasi, 1967), p. 56, pl. XVI, Nos. 4,5,6 and 7.
2. Narain and T. N. Roy, *Excavations at Rajghat*, (Varanasi, 1976), p. 24.
3. *A.I*, nos. 10 and 11, pp. 85-86, pl. XLIII, 4, 7, 9 and 10.
4. K.K. Sinha, *Ibid.*, 1967, pp. 56-57, pl. XVII, 10, 11 and 12.
5. Our own observation.
6. *I.A.*, 1954-55, p. 15, pl. XXVIIB.
y. *I A.*, 1956-57, p. 19.
8. *I.A.*, 1955-56, p. 22.

and Kausambi[1] (from 250 B.C. upwards). In view of its wide distribution and presence of decorative and often symbolic motifs it may be assumed that elephant was regarded as an animal of respect and importance during this phase.

NAGA FIGURES

Serpent figurines representing probably Nagas (serpent deities) are known from the contemporary layers of numerous sites like Sravasti, Prahladpur, Vaisali, Chirand, Sonepur, Rajghat, Rajgir, Ujjain and Chandraketugarh. These are found invariably in red colour, with head and eyes indicated either by pricked holes or two punched circlets or by applied discs. In some cases, the parallel incised lines with a row of punched circlets indicate the rings and scales on the body of the serpent. One specimen of grey with black slip has been reported from Pataliputra.

Our study of the figurines show that perhaps there were four stages in the modelling of these deities. At one stage, the entire body was that of a serpent. Vaisali[2] and Pataliputra[3] specimens fall under this head. In another stage, the serpent and the lower portion of female figure were combined into one unit. The female figure being highly conventionalized. A solitary specimen from Prahladpur[4] falls under this head. In yet another stage, the body of female figurine is decorated by circlets, incised lines or oblique strokes. It may be recalled here that horizontal rows of circlets on the hip-portion are common feature of the mother-goddess type. A solitary specimen from Sravasti[5] and Chandraketugarh[6] and several from Sonepur[7] come under this category. In the last stage, the figurines show a beautiful moulded head of a Naga wearing a peaked head dress, decorated with five serpent hoods. The facial feature is flat and ovoid bearing resemblance to the faces of the Sunga sculptures. A specimen from Vaisali comes under this head. From comparable levels such figurines with serpent hoods have been found at Tamluk and Kausambi[8]. It is not possible to say which stage is the earliest. But from the wide distribution and standardization of the figurines on the sites of the Late Phase of the NBP, it can be said that naga worship was a popular cult among the people.

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[1] G.R., Sharma, *Excavations at Kausambi*, 1949-50, (Delhi, 1969), p. 71, pl. XLIB, 1 and 2.

[2] Deva and Misra, *Vaisali Excavations*, 1950, (Bihar, 1961), p. 55, pl. XVIIA, Nos. 1,2 and 3.

[3] Sinha and Narain, *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 44, pl. XVIA, Nos. 1 and 2.

[4] Narain and T. N. Roy, *The Excavations at Prahladpur*, 1963, (Varanasi, 1968), p. 46, pl. XVIII, No. 18.

[5] K.K. Sinha, *Excavations at Sravasti*, 1959, (Varanasi, 1967), p. 54, pl. XIV, No. 7.

[6] *I.A.*, 1957-58, p. 51, pl. LXXVA.

[7] *I.A.*, 1956-57, p. 19, pl. XXVA.

[8] *I.A.*, 1953-54, pl. XIB.

HORSE

The horse was another favourite theme. In the case of Hastinapura, Sravasti and Vaisali specimens, the modelling is elegent but in the figures of Kausambi, Rajghat and Pataliputra, the rendering is not so realistic. But the noteworthy feature is the decoration which consists of incised lines both horizontal and oblique interspersed with small punched circles. The motif is important as it occurs on other animals also. (HST., p. 86. pl. XLIII. No. 6; VSL , p. 55, pl. XVIIB, No. 5; KSB., p. 71, pl. XLIIIA, No. 3; Pataliputra, pp. 43-14 Pl. XV, Nos. 1, 2, 3, 5, 6 and 8; SRV., p. 17, Pl. XVII, Nos. 15 and 17).

Amongst other animals represented is an unfinished lion in dark grey fabric from Hastinapura; fishes from Sravasti and Pataliputra; dogs from Mathura, Kausambi, Pataliputra and Vaisali; a bull from Vaisali[1], a monkey with three legs, possibly serving some religious purpose, from Mathura[2]; deers from Kausambi[3]; a tortoise and a ram from Pataliputra and a few birds from Sonepur[4] and Pataliputra. Mention may also be made of a figure of a winged and humped animal (possibly lion ?) and a theriomorphic representation of a monster from Sravasti[5]. Besides these, the legs of some of the animals were holed so that the figurines could be fitted with wheels. These were obviously objects of play for children. Some 'Vyal' figures depicting human head and animal body seems to have been introduced during this phase. These are reported from Mathura, Sravasti, Ahichchhatra and Vaisali. A figure having female head and body of a horse in grey fabric is found from Ahichchhatra. An interesting representation of a mythical figure in the form of a bull-headed naga figure in grey comes from Mathura[6].

In view of the common belief in the sanctity of the cattle, particularly cow, the complete absence of the cow and buffalo from the animal figurines is rather surprising. Similarly the bull figurines are also nearly absent from this phase. On the other hand, the Kushan levels of several sites show the occurrence of figurines of cattle. Birds also did not receive the same amount of attention as animals and human beings.

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1. Deva and Misra, *op. cit.*, p. 56, pl. XIIIB, No. 13, The identification is doubtful.
2. *I.A.*, 1954-55, p. 15.
3. G.R. Sharma, 1969, *op. cti.*, p. 72, pl. XLIIIB, Nos. 1 and 2.
4. *I.A.*, 1959-60, p. 14 and *I.A.*, 1960-61, p. 5.
5. K.K. Sinha, 1967, *op. cit.*, p. 57, pl. XVII, No. 14.
6. Information given by Smt. Pratibha Prakash of Banaras Hindu University.

3. STONE OBJECTS

In the PGW phase, stone pestles are reported from sites like Sardargarh, Daulatpur and Atranjikhera. The details from the first two sites are not known[1] but the Atranjikhera specimen is a complete piece of red sandstone[2]. From the same level is a whetstone (sharpener) of slate and weights of chert and jasper from Hastinapura[3]. Corroborative evidence of stone pestles is available at Jaderua and Prakash where a similar pestle or muller of sandstone has been reported from the strata of comparable age[4]. At Prakash and Jaderua, we have also an evidence of the legged variety of querns from the comparable strata. Besides these from the PGW deposit, we have stone balls of different sizes from Allahapur and stone beads from Noh. A rectangular stone object with smoothened surface has been reported from Allahapur.

In the Late Phase of NBP or the Late Phase of Iron Age we have several varieties of querns which are reported from Prakash, Nasik, Nevasa, Ahichchhatra and Sravasti (although the description of Sravasti specimen is not given but number 8 specimen among the objects illustrated in Plate XXVII of Sravasti Excavation Report appears to be a variety of a legged quern). Mullers of red sandstone also continue in this phase. But they are of different varieties. These are reported from Hastinapura, Sravasti, Ahichchhatra, Ujjain, Nagda and Rajghat. Whetstone (sharpener) of slate also continue to occur. An illustrated example comes from Sravasti. This specimen of Sravasti is smaller than the Hastinapura sharpener of the PGW phase but both have a pronounced concavity. Weights of jasper in graded series are also reported from the Late Phase of NBP at Vaisali. Among other objects of miscellaneous use mention may be made of stone discs from Nagda, Ujjain, Sravasti, a potter's dabbar from Ujjain, a mould of soapstone from Sravasti and stone vessels from Pataliputra.

4. BONE POINTS

These are objects of bone having points at one or both ends. These have been variously described as arrow heads, styluses, awls, pins, gouges, comb-teeth, bobins and bone tools etc. This was according to their usage. Possibly, these might have been also used as potter's tool viz. for decorating terracotta discs and making gooves and incisions over lather

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1. These find mention in Vibha's, The Painted Grey Ware—An Iron Age Culture of Northern India, (Delhi, 1976), pp 29, 34 and 12 but the pestles are not reported in the interim excavation notes of Daulatpur published in *Indian Archaeology*, 1976-77, p. 19 and *Indian Archaeology*, 1977-78, p. 23.
2. *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 47.
3. *Ancient India*, nos. 10 and 11, p. 90.
4. *Ibid*., nos. 20 and 21, p. 106, Type 4.

hard clay vessels[1]. To whatever use they are put, it is certain that these specimens are of bone and are pointed either at one or both the ends and hence they are described as bone points.

These have been found in large number in the PGW phase. As arrow-heads these have been reported from sites like Ropar, Alamgirpur, Allahapur, Noh, Atranjikhera, Pariar, Hulas, Jakhera and Kausambi. At Hastinapura also quite a large number of bone points were recovered but here these are described as bone styli and knitting needles. At Ropar, Alamgirpur and Allahapur, these are termed as styli, pins and awls. One specimen at Hastinapura is probably a cap or socket to protect or cover the working point of the stylus[2]. But in the absence of any written material from the PGW phase it is difficult to agree with this view. Such sockets are also reported from Noh and Sardargarh. Alternatively, these sockets might have been used to protect the working end of the potter's tools. Most of the bone points at Allahapur are manufactured out of antlers. The presence of number of unfinished and finished bone points in the PGW phase of Allahapur show that these were locally manufactured.

These are also reported in large number from the Early Phase of NBP at Sravasti, Prahladpur, Rajghat, Masoan, Khalaua, Sonepur, Sringverapura, Kausambi, Atranjikhera, Jakhera, Mathura, Vaisali and Patna.

From the strata of comparable period these are reported from Prakash, Ujjain and Eran. At most sites these are described as arrow-heads. Twenty one fragment of bone points, both finished and unfinished, in the Early Phase of NBP at Prahladpur, show that these were locally manufactured. Here these are boradly classified into two major groups : One having points at both ends (Type I) and the other with only one end pointed (Type 2). Type 1 is further divisible into double ended points with one end shorter (Sub-type IA) and double ended points with equal ends (Sub-type IB). Type 2 is also further divisible into tanged bone points (Sub-type 2 A), socketed bone points (Sub-type 2 B), long and short pointed bone points (Sub-types 2C and 2D)[3]. Most of them must have been used as arrow-heads. The evidence from Sravasti gives a clear indication that two types of arrow-heads were used in the Early Phase of NBP. Type (a) have sharp circular points at one end and a hollow socket hole for shaft-tenon at the other (*SRV* , Nos. 1 and 3, pp. 69-70, Pl XXIII). Type (b) have a sharp circular points as in case of Type (a) but on the other end it has a well defined tang (SRV., Nos. 4 and 5, p. 70, Pl. XXIII). Similar corroborative evidence comes from Kausambi. Here the earliest occurrence of bone arrow-head comes from the PGW phase of Period II (dated from *circa* 885 B.C. to *C.* 605 B.C.). Although they

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1. A. K. Narain and T. N. Roy, *The Excavations at Prahladpur*, (Varanasi, 1968), p. 42.
2. *Ancient India*, nos. 10 and 11, p. 105, no. 11, plate IX, no. 11.
3. A. K. Narain and T. N. Roy, *The Excavations at Prahladpur*, (Varanasi, 1968), pp. 38-43.

continue to occur as late as 515 A.D., their main concentration was in the Early Phase of NBP. Arrow-heads with sharp point, single tanged often with sockets and circular cross section are the popular type of this phase. A bone point inserted with an iron shaft is an interesting evidence from the Early Phase of NBP at Atranjkhera. Bone points are reported from the NBP Period of Vaisali and Patna but it is not clear to which level of NBP they belong. From comparable levels these are found at Ujjain, Prakash and Eran. At Ujjain these are described as arrow-heads, bone styli and a socket for the working end and at Prakash only as styluses. But again in the absence of any writing from this pre-NBP black-and-red ware phase both from Ujjain and Prakash it is difficult to agree that they were used as styluses.

Bone points are also reported in large number in the Late Phase of NBP. They continue to occur at almost all the sites of the PGW and Early NBP Phases. But their types and use becomes diversified. The evidence from Sravasti gives a clear difference between the arrow-heads of the Early and Late Phases of NBP. In the Late Phase of NBP, the arrow-heads are sharpened at both ends. This variety is found in clusters of hundreds at Sravasti, Ujjain, Rajghat and Nasik and have always outnumbered all other types (SRV., Nos. 7 and 8, p. 70, Pl. XXIII). There are definite evidence of the manufacture of these bone points at Ujjain as we have in the PGW phase at Allahapur. At Ujjain, arrow-heads were found in cluster, giving an idea of a manufactory, which probably collapsed. A bone arrow-head in one case was found stained with the blood of a bird. At Kausambi also some arrow-head of this phase were stained black due to blood or poison. Like the evidence from the Early Phase of NBP at Atranjikhera, a bone point inserted with an iron rod from the Late Phase of NBP at Allahapur, presents an interesting evidence. Bone points are also reported from Sugh, Nagda, Avra, Tripuri, Eran, Besnagar, Maheshwar, Broach, Nagara, Prabhas Patan, Prakash, Ter, Brahmapuri and several other sites. At Ropar these are described as styluses; at Sonepur as pins; at Kausambi as styluses ; at Sugh, Vaisali and Patna as bone points; at Bangarh as awls ; at Chandraketugarh as awls and cosmetic sticks ; at Eran as pins ; at Prakash as styluses and borer and as arrow-heads and bone points from several other sites.

Observation :

In the PGW and Early NBP Phases, bone points were mostly used as arrow-heads. Their type and number was restricted. Bone points described as styluses during these phases were not used as styluses as writing was not known during this period. In the Late Phase of NBP or Late Phase of Iron Age their use and types were diversified. These were reported in cluster of hundreds at Ujjain, Rajghat, Nasik and Sravasti. We have evidence of their manufacture both in the PGW as well as Late Phase of NBP. A bone point inserted with an iron rod is yet another evidence from both these phases. The poisioning of tips of the arrow-heads from Ujjain and Kausambi is reported only from the Late Phase of NBP.

5. OTHER OBJECTS OF BONE, IVORY, HORN AND SHELL

A variety of other objects are reported during the PGW and Early NBP Periods. Bone pins or needles are found in the PGW phase of Hastinapura, Ropar, Alamgirpur and

Allahapur. Bangles of bone comes from Hastinapura, Allahapur and Sardargarh. The bone objects reported from the PGW phase of Atranjikhera are points, sockets, combs (one with circlet design), pendant and knitting needles. At Jakhera besides arrow-heads we have points, comb, antimony rods, mirror handles, spacers, ear-studs, discs and beads. The mirror handles, combs, antimony rods and arrow-heads were richly carved with incised decorations. A skin rubber of bone is found in the Early Phase of NBP at Sravasti. Two horn objects, one decorated with bold ribs and other a bracelet with rope design comes from the PGW phase of Hastinapura. A horn object with burn marks and of indeterminate use is also found at Allahapur. In the ivory objects kohl-sticks are found at Ropar and a fragmentary decorated disc and a perforated pear-shaped object with groove, both of ivory are reported from the PGW phase of Hastinapura.

In the Late Phase of NBP or the Late Phase of Iron Age the objects of bone, ivory, shell and horn comprised a variety. These are described below material wise (Plate 10) :

Bone :

Bone was the material for the largest number of objects. The most common objects were the bone points and styluses which have been already dealt with above. A skin rubber have been reported from Sravasti (Pl. 10, No. 21). Bone-pins, used either as knitting needles or hair pins were found at Sravasti, Ujjain and Vaisali. A stopper is reported from Hastinapura. A perfume-casket with delicately worked stopper comes from Prakash[1] (Pl. 10, No. 13). A cylindrical casket of bone also comes from Ujjain. The other objects reported from Sravasti are a goldsmiths hammer (?) reel, plumb bob (?) (Pl. 10, Nos. 19 and 20) and a disc. Kohl-sticks are reported from Nevasa,[2] Nasik[3] and Taxila[4]. A crescentic bone amulet or a tooth-pick with a point at one end and a hole for suspension at the other comes from Vaisali.

Ivory :

Bone points of ivory are also reported from several sites. Combs are found at Prakash, Nagda and Ujjain (Pl. 10, Nos. 11, 12, 10 and 9). Discs at Jajmau[5] and Ujjain, hair-pins at Ujjain, Prabhas Patan and Nagda[6] (Pl. 10, Nos. 2 to 7). Awls, pigment sticks and antimony-rods are reported from Ujjain. Bangles are only reported from Jajmau. A stopper of ivory

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1. *Ancient India*, nos. 20 and 21, p. 129, pl. XXIX, no. 6.
2. *Fron History to Prehistory at Nevasa*, 1954-55, (Poona, 1960), p. 456.
3. *Report on the Excavations at Nasik and Jorwe*, 1950-51, (Poona, 1955), p. 119.
4. J. Marshall, *Taxila*, volume II. pp. 585-586.
5. *Indian Archaeology*, 1957-58, *A Review*, (1958), p. 49.
6. *Indian Archaeology*, 1955-56, *A Review*, (1956), p. 14, plate XXIV B.

decorated with a row of elephant design and an ivory pendant are illustrated at Ropar[1]. Certain ivory plaques resembling female figurines are found at Prabhas Patan[2] and Nagda (Pl. 10, Nos. 16, 17 and 18).

Horn :

A tooth-pick (Pl. 10, No. 14) and a ring of horn are reported from Hastinapura.

Shell :

Some of the shell objects are reported from the comparable levels of Nasik[3]. One of them had traces of copper rivetting at one end, while holes were left at the other end opposite to it. Four of them are also perforated. One cannot be sure about their definite use but some of them were most probably used as pendants or for similar purpose. It may however, be noted that rivetted shells were used as head ornaments at Mohenjodaro. Their fashion might have continued even in this period for it survives in some parts of India even today.

6. Bangles, Rings and Ornaments

From PGW and Early NBP Phases :

Bangles :

Bangles of bone, glass, shell and terracotta are reported from these phases. Out of the fourteen shell bangles from Period II of Prakash, the one illustrated belongs to the strata of comparable age and is squarish in section. Glass bangles are reported from PGW phase of Hastinapura, Early Phase of NBP of Sravasti and comparable levels of Prakash. These are monochrome and the favourite colour is light green. The other colours noted are light brown, sea-blue and black. A thick bracelet of black is interesting piece from Sravasti. Terracotta bangles come from Ropar, Allahapur and Atranjikhera. A terracotta pendant from Hastinapura and a bead necklace from Atranjikhera are the other ornaments of this level.

From Late Phase of NBP :

Bangles :

Bangles continue to occur also in this phase but there is a marked change in the following respects.

1. Decoration of bangles started in this phase. A decorated shell bangle squarish in section but decorated with a pattern showing oscillated lines is reported from Prakash. A copper bangle was decorated with a herring bone design at Hastina-

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[1] *Ancient India*, no. 9, p. 124, fig. 4, nos. 9 and 11.

[2] *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 17.

[3] *Report on the Excavations at Nasik and Jorwe*, 1950-51, (Poona, 1955), p. 118, plate XXIX, nos. 1, 2, 5 and 6.

pura. A bangle of terracotta was also decorated with a design impressad round the circumference at Sravasti.

2. Bangles of agate, terracotta, stone, shell and copper are reported in this phase. These are from Ujjain, Rajghat, Hastinapura, Sravasti and Prakash. Terracotta and stone bangles are found at Sonepur. Glass, shell and terracotta bangles are also reported from Broach.

3. Conch shell bangles, two in number, are found at Nasik.

Rings :

Ring also started appearing in this phase. A Ring of flattened copper wire comes from Sravasti. Rings of chalcedony, horn and copper are also reported from Hastinapura.

Ornaments :

Pulley-shaped ear-ornaments of red jasper (Pl. 10, No. 27) and crystal are found at Prakash. A pulley shaped jasper ear-stud having a gold plate with a repousse pattern comes from Prabhas Patan[1]. Ear-studs of terracotta are also reported from Buxar[2], Pataliputra[3], Vaisali[4] (Pl. 10, Nos. 25 and 26) and Mathura. Besides these, large number of amulets and pendants are reported from this phase. The important ones are a serpentine pendant from Ahichchhatra[5], a perforated bone amulet from Vaisali, and ivory pendants from Nagda and Prabhas Patan (Pl. 10, No. 15). Human shaped pendants are reported from Ujjain[6].

7. Terracotta Discs

Among all the objects of terracotta, the discs are found in good number and especially noted from the varied incised decorative designs on them. They are flat, circular objects of well fired clay with standard weight, diameter and thickness. Unlike pottery discs these are fashioned intentionally for use and exclusively decorated either all along the periphery or on the periphery and the centre or all over the surface. The technique of their manufacture shows that they are also the product of the potter's mind[7].

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[1] *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 17, Pl. XVIII A.

[2] *Ibid.*, 1963-64, *A Review*, (1967), p. 8.

[3] B. P. Sinha and L.A. Narain, *Pataliputra Excavations*, 1955-56, (Patna, 1970), p. 46, Pl. XVIII A, Nos. 1 and 6.

[4] *Vaisali Excavations*, 1950, (Bihar, 1961), p. 57, Pl. XIX C, Nos. 1 to 4.

[5] *Ancient India*, no. 8, pp. 50-51, Fig. 4, No. 83.

[6] *Indian Archaeology*, 1957-58, *A Review*, (1958), p. 36.

[7] A detailed typological study of terracotta discs has been made in *Prahladpur Excavations Report of* 1968. Also see, T. N. Roy, 'Continuity and Change in Terracotta Discs,' a paper to be published shortly in Prof. G. S. Dikshit Felicitation Volume, Mysore.

From PGW level these are reported from Hastinapura, Kampil, Atranjikhera, Jakhera, Batesvara, Mathura, Farrukhabad, Hulas, Pariar, Noh, Allahapur, Daulatpur and Thapli. Out of the eleven discs illustrated from the different periods of Hastinapura, two are pottery disc (which does not concern us here) and the remaining nine are terracotta discs. Out of nine discs, five belong to the PGW phase (HST., Pl. XLVI, Nos. 1, 6, 7, 9 and 11) and one to the Late Phase of NBP *i.e.* Period III of Hastinapura (HST., Pl. XLVI, No. 3) All these five discs from the PGW phase of Hastinapura are decorated all along the edge or periphery with the incised nail pattern design. Similar decorative disc have been recently reported by K.P. Nautiyal at Thapli, a PGW site in Tehri-Garhwal[1]. The details of decoration from other sites is not available. The conventional[2] depiction of the sun-symbol is to be found in the PGW phase at Atranjikhera.

From the Early Phase of NBP, these are reported from Sravasti, Prahladpur, Rajghat, Masoan and Noh. By far the best corroborative evidence for the Hastinapura PGW discs comes from the comparable pre-NBP strata of Prahladpur. Here all the three terracotta discs reported from Sub-period IA (dated from *circa* 800 to *circa* 600 B.C) are decorated with designs all round the edge or periphery. In two cases the designs consists of incised nail pattern while in third case they look more or less like suspended loops (PLP., Fig. 19, Types IA, IB and 2C). In the Early Phase of NBP we also get some terracotta discs decorated with designs of free-wheel in clock-wise direction, a combination of nail pattern and suspended loops, V-shaped pattern, conventional depiction of the sun-symbol, stylized figure of a deer depicted by incised lines and incised nail pattern design made at random all over the surface. (PLP. Fig. 19, Types 3A, 5B, 8, 7A, 18 and 15). Discs bearing nail pattern design, rope-impression, antelope-like design and sun-symbol are also reported from the comparable levels of Rajghat. Discs bearing incised nail pattern and sun-symbol are also found in the Early Phase of NBP at Sravasti. Incised and scalloped discs were obtained from the Period III of Noh[3] (overlap phase of PGW and NBP). Discs with nail pattern design are also reported in a exploration conducted by V.N. Misra on a mound called Bhishmapur (associated with Draupadi) on the western corner of the town of Farrukhabad[4].

These terracotta discs also continue to occur in the Late Phase of NBP at Hastinapura III, Sravasti II, Prahladpur IC, Rajghat IC, Atranjikhera, Masoan, Ayodhya, Allahapur and Avra. At Prahladpur there is a clear indication that conventional *svastika* and floral designs appear for the first time only during this phase (PLP., Fig. 19, Types 10 and 13).

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1. Information kindly supplied by K.P. Nautiyal who recently excavated this PGW site.
2. *Indian Archaeology*, 1963-64, *A Review*, (1967), Plate XXXII, No. 13.
3. *Indian Archaeology*, 1971-72, *A Review*, (1975), p. 42.
4. *Ibid.*, 1965-66, *A Review*, (1973), p. 47. These are reported in association with PGW and NBP.

Corroborative evidence comes from Hastinapura (HST., PL. XLVI, No. 3), Masoan and Sravasti (SRV., No. 9, p. 59). At Masoan[1], beside the *svastika* design we also get trident, round circles and radiating lines from one central point. In the strata of comparable age at Ujjain and Nagda, instead of terracotta, the discs were made out of polished stones[2]. These were similar to the terracotta prototypes of the PGW and Early NBP Phases.

Observation :

1. These are fairly common on the PGW and Early NBP sites of the Upper and Middle Ganga Plains. But are also reported from the PGW phase of Noh in Rajasthan, Daulatpur in Haryana and as far as Thapli in the remote part of the Himalayan region. These are totally absent from the sites of the Lower Ganga Plain *i.e.* the Bihar and the West Bengal regions.

2. On the basis of the evidence of Hastinapura, Mathura and Prahladpur we can say that discs decorated with simplest designs like nail pattern and suspended loops were the earliest. But they continue to occur in the Late Phase of NBP also. In fact, designs like *svastika* and floral appear for the first time only in this phase. But their use was comparatively restricted in this period. So the present evidence does not suggest their abrupt absence after 300 B.C[3].

3. The technique of manufacture including even the use of same slip either on PGW or NBP and these discs show that they are also the product of the same potter's mind who were producing PGW and NBP. These discs therefore may be regarded as one of characteristic trait of the PGW and Early NBP Phases of the Ganga Plains.

4. Much care in manufacture, standardization in weight, diameter and thickness, fairly well defined incised motifs, their provenance in the PGW and the Early Phase of NBP show that they were object of importance. Surely they cannot be used as object of worship because the sun and the *svastika* symbols are not only highly conventionalized but are also rare. The designs on them are purely decorative rather than symbolic. On the other hand as the Prahladpur evidence shows they have a series[4] of weight, diameter and thickness which

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[1] *Indian Archaeology*, 1964-65, *A Review*, (1969), p. 42 and *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 51.

[2] *Indian Archaeology*, 1955-56, *A Review*, (1956), p. 14 and 19.

[3] K.K. Sinha, 'Continuity and Change in the PGW Culture—The evidence of Terracotta Disc', a paper read at the Seminar on Indian Prehistory, held at Allahabad University, Allahabad in December, 1980.

[4] The following series of weight, diameter and thickness is available from Prahladpur :

(1) From levels assignable to circa 800 to 600 B. C. (pre-NBP phase) :

Weight in gram		*Diameter in mm*		*Thickness in mm*
37.508	×	46	×	12.50
31.368	×	47	×	13.00
9.710	×	33	×	6.00

suggests that these might have been used as weights. However, a more detailed study from sites can only offer some meaningful conclusion about their actual use. But it is certain that they cannot be described as simple objects of play or gamesman. On the other hand what merchandise required such weights is also not clear.

8. Miscellaneous Objects of Terracotta (Plates 11 and 12)

A wide range of miscellaneous objects in terracotta is seen on the PGW sites. The most interesting discovery are four geometrical objects[1] of terracotta found in the PGW phase of Jakhera (Period II A called proto-PGW phase by the excavator). Three of these are triangular with two straight sides meeting each other at an approximate angle of 90° and with an arc as the hypotenus. The fourth is squarish with three straight and one circular sides. These were probably used as geometrical instruments. An incised design of intersecting circles on grey ware sherd at Jakhera is another instance which shows that geometrical science was developed during the PGW phase. Terracotta pestles mostly baked but sometimes also un-baked or grinders with multi-coloured stones set into the clay are the typical finds of the PGW phase. These are reported from Ahichchhatra, Atranjikhera, Hastinapura,

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(2) From levels assignable to circa 600 to 400 B.C. (Early NBP Phase) :

93.650	×	69	×	14.50
45.270	×	47	×	14.00
42.917	×	48	×	13.00
42.200	×	49	×	13.00
41.310	×	49	×	12.50
40.370	×	50	×	9.00
36.270	×	49	×	12.00
26.515	×	45	×	10.00
25.605	×	41	×	12.00
20.760	×	42	×	9.00
18.368	×	39	×	8.50
16.562	×	37	×	10.00
13.106	×	32	×	18.00
11.900	×	33	×	8.00
10.569	×	34	×	7.00

(3) From the Late Phase of NBP we have the following series :

67.719	×	53.5	×	17.00
50.769	×	53.0	×	12.50
39.705	×	46.0	×	12.25
3.700	×	23.0	×	5.00

[1] M.D.N. Sahi, 'Comparative Chronology of Early Iron Age Cultures in India', (A Study of the Role of Iron in. Socio-Economic change), unpublished Ph.D. thesis of 1979, p. 298, Plates IV and V.

Ropar, Alamgirpur, Allahapur and Noh. Dices in grey colour are found at Noh. Allahapur and Chak 86. Balls of different sizes are reported from Allahapur. A feeding cup with a loop handle, a conical seal and pottery discs (both with single and double perforation) are the finds from the PGW phase of Hastinapura (Pl. 11, Nos. 10 and 11). Bangles of terracotta are seen at Ropar, Allahapur, Atranjikhera and Jakhera. Pendants or ear ornaments, stoppers, cones are the other objects reported though sporadically, on the PGW sites. A terracotta bead necklace from Atranjikhera is an interesting evidence.

The geometrical science[1] was also developed in the corresponding age is confirmed by the find of a terracotta disc incised with opposite angles in the pre-NBP black-and-red ware phase of Rajghat. In the Early Phase of NBP we have also several terracotta objects of entertainment and other miscellaneous use. Almost similar pestles or grinders (similar with the PGW phase) with coloured stones set into the clay are reported from Prahladpur and Masoan. Pottery discs, cart-wheels (without hub), dabber, ball of different sizes, ear studs, skin rubbers, stoppers and cones are reported from Rajghat comparable levels. Pottery discs with single or double perforation are found at Hastinapura, Sravasti and Prahladpur. A dabber is found at Sravasti (Plate 11, 20) and Prahladpur. Stoppers and cones also occur at Prahladpur (Plate 11, Nos. 6 to 9). Caskets and a spool are reported from the strata of comparable age from Prakash. Large number of plain cylindrical sticks (of indeterminate use), skin rubbers, decorated tiles and a crucible with a pointed end are the other finds from Sravasti (Plate 11, Nos 15, 16 and 17).

Almost all the miscellaneous objects of terracotta found in the preceding phase also continue in the Late Phase of NBP. But their frequency and range increases. These can be grouped into the following categories (Plate 12).

(i) Objects of Recreation :

These are discs, balls, pottery discs, gamesmen and wheels. Discs are reported from Ujjain. Balls from Ujjain, Vaisali, Prahladpur, Rajghat, Avra and Nagda. At Nagda, a terracotta ball was found inscribed. Pottery discs with single, double or without any perforation are reported from almost all the sites. The noteworthy sites are Prahladpur, Rajghat and Ujjain. Gamesmen or terracotta cones and a seal impression are particularly known from Hastinapura (Pl. 12, Nos. 1 and 2), Prahladpur, Rajghat and Ujjain. Wheels and wheels of toy cart are found at Sravasti, Avra and Pataliputra (Pl. 12, Nos. 3 and 4). Terracotta toy wheels are also reported from Vaisali (Pl. 12, No. 10). A terracotta toy-cart was found at Atranjikhera (Pl. 12, No. 14).

(ii) Objects of Toilet :

These are skin-rubbers and head-scratchers. Skin-rubbers are found at Hastinapura, Ujjain, Nagda, Pataliputra, Sonepur, Rajghat and Prabhas Patan. At Hastinapura it is

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1. A.K. Narain and P. Singh, *Excavations at Rajghat*, part III, *Small Finds*, (Varanasi, 1977), p. 56, Plate IX, No. 13.

rectangular in shape (Pl. 12, No. 5). The Pataliputra specimen is square and bears a knot-like design on both the sides (Pl. 12, No. 6). A flesh-rubber bearing an inscription in the character of the second century B.C. was found at Prabhas Patan[1].

Head scratchers are also fairly widespread, being found principally at Nasik, Maheshwar, Kausambi, Ropar, Nagda, Ujjain and Prakash. The best example comes from Prakash, comparable levels where it consists of a boatshaped hollow, semi-circular or parabolic in outline and sometimes having a hole at the vertex[2] (Pl. 12, No. 7).

(iii) Objects of household use :

These comprise potter's stamp, dabbers, stoppers, pestles and feeders. Potter's stamp are found at Ujjain, Prakash and Sravasti. Sravasti specimen was used for impressing a lattice design and Prakash specimen for stamping floral design. A terracotta printing[3] block was found at Atranjikhera (Pl. 12, No. 11). Dabbers are reported from Vaisali and Rajghat. A pestle with triangular notches and used for grinding has been reported from Sravasti. A feeder-like object of dull-red ware has been found at Prakash (Pl. 12, No. 8). Stoppers are reported from Prahladpur and Avra. A fragment of a mosaic probably used for floors was found at Atranjikhera (Pl. 12, No. 13).

(iv) Objects of Worship :

A ritualistic object showing beaked projection on either side is found at Sravasti.

(v) Object of Trade :

A seal with impression is reported from Hastinapura. Weights are found at Jajmau, Sonepur and Vaisali. Sonepur[4] specimens are of steatite while Vaisali weights[5] are made of jasper. Vaisali specimens are all cylindrical and vary in weight from 5.35 to 13.18 gm.

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1. *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 17.
2. *Ancient India*, nos. 20 and 21, pp. 119-120, Pl. XXVI, No. 11.
3. *Indian Archaeology*, 1965-66, *A Review*, (1973), p. 47, Plate XXXIII B.
4. *Indian Archaeology*, 1956-57, *A Review*, (1957), p. 19 and *Indian Archaeology*, 1959-60, *A Review*, (1960), p. 14.
5. Deva and Misra, *Vaisali Excavations*, 1950, (Vaisali, 1961), p. 64, Plate XXIII B.

7

Conclusion

In the previous pages, we have tried to present the multifold data in respect of the two well known periods of Indian archaeology, viz., the Painted Grey Ware and the Northern Black Polished Ware. Temporally, the span covered is *circa* 800-700 B.C. to 100 B.C. or to the beginning of the Christian era and, in terms of space, the whole of the Ganga Plains of India (Table 7).

Modern geographers have often not taken cognizance of the fact that it is the culture of man as a group which plays the role of the agent to work out the region. Archaeologists on the other hand have been vague and some times unrealistic in using the physiographically determined schemes offered by geographers. The actual boundary drawn in the present scheme between the Upper Ganga Plain and the Middle Ganga Plain is the Allahabad-Faizabad railway line which is based on crop combination, density of population and administrative units. This scheme of delimitation followed by us coincides also archaeologically, for most of the OCP sites are found in the Upper Ganga Plain, the terminus station being the site of Sringverapura in District Allahabad, and the PGW also does not extend beyond east of Kausambi and Sringverapura. The tradition of painting black-and-red ware is also absent west of Allahabad. Thus in this scheme of delimitation between Upper and Middle Ganga Plains, attempted for the first time by us, we find harmony between the geographical factors and the nature of ancient human settlements.

We have made a critical survey of nearly sixty sites of the Ganga Plains. Even with its sub-division into Upper, Middle and Lower, the Ganga Plains projects itself as a single territorial unit on a large physiographic scale. Here one can hardly ignore the unifying role of the Ganga in acting as the strongest bond. Further taking Ganga as the dividing line, the plains can be further longitudinally sub-divided into Ganga Plain South and Ganga Plain North, because these two regions show significant variations physically. The Ganga Plain South is relatively more densely populated also more urbanized and industrialized. Culturally and archaeologically also, the Ganga dominance and its traditional veneration is reflected in the nature of ancient human occupance. Almost all the

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principal Iron Age sites are located on its bank. It also served as a barrier to cause differentiation in the nature of ancient human settlements in the two regions.

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principal Iron Age sites are located on its bank. It also served as a barrier to cause differentiation in the nature of ancient human settlements in the two regions. In the Ganga Plain South, there is heavy concentration of sites located close to each other and exhibiting marked trends towards urbanization. In the Ganga Plain North, the Iron Age settlements are relatively less as well as diffused.

In this study our approach has been a bit different from what is generally followed by other archaeologists. Firstly, we proceeded from top to bottom, *i.e.* from well known periods to less known and then to still less known. In other words, we started our study from the well documented material belonging to Saka-Kushan Period (called as post-NBP), then went on to PGW and NBP Periods and lastly to those loosely termed as pre-PGW or per-NBP deposits. Secondly, we laid emphasis on total assemblage rather than on the characteristic pottery alone. Uptill now, PGW and NBP have been too much played about not only as cultural labels but also as the main criteria for the demarcation of cultural periods. The other cultural assemblage, like the introduction of iron and structures of baked bricks, etc., were only touched upon as a subordinate topic. We have tried to compensate this subordination by giving considerable space and thought to them in this study.

In the line of thinking generally prevalent it is difficult to imagine the so called PGW and NBP cultures without any sherd of PGW and NBP. But we have noticed that there are a few sites, viz., Manda in Jammu and Kashmir, Ranihat in Garhwal and Jaderua in Gwalior, on which although PGW is totally absent, the other cultural equipments clearly indicate that the deposit belongs to the PGW culture. If our observation at Kampil is any guide, the PGW was almost absent at this single period PGW culture site. Also there are several sites like Sravasti, Alamgirpur, Allahapur and Kesari in the Upper Ganga Plain, Jaugada in Orissa, Tamiuk in West Bengal, Nagari in Rajasthan and Swalda in Maharashtra, on which NBP is totally absent, yet on the basis of other cultural equipments these sites can definitely be associated with the so called NBP culture or Period. We are confronted with yet another situation in which the PGW and NBP occur together. This overlap of PGW and NBP was pointed out by the author for the first time in 1964-65, when, it was believed that the former was succeeded by the latter everywhere. Now this overlap is well indicated on sites like Kausambi, Sringverapura, Atranjikhera, Jakhera, Mathura, Hulas, Pariar, Ahichchhatra and Sravasti. Even these sites, having an overlap of the two important wares, have been included by some archaeologists as representing the last stage in the chronological groupings of the PGW culture. Merely on the basis of a few sherds of the PGW which are found in the occupational debris of the Early Phase of NBP, how one can say that the deposit belongs to the last phase of the PGW culture. In such a situation one would always think that the PGW sherds comes from the early sub-period of the NBP Period. It would be no exaggeration to state that in the demarcation of cultural periods or stages, we have been so far laying too much emphasis on the occurrence or the non-occurrence of PGW. On sites like Koldhiwa and Pandu Rajar Dhibi, the Early Phase of Iron Age (to which PGW and Early NBP also belong) is devoid of both

PGW and NBP. PGW and NBP are not cultures in themselves but are only one of the dominant attribute of a culture. In the present stage of our knowledge there is a need to put them in broader perspective. Thus the present critical study reveals that in between Saka-Kushan level and the chalcolithic culture of Ganga Plains lies an Iron Age deposit which could be conveniently divided into two sub-periods, the Early Phase of Iron Age and the Late Phase of Iron Age or the Late Phase of NBP. Culturally speaking, the Early and Late Phases of Iron Age denote the early and the mature phases of the Ganges civilization.

Since PGW and NBP are one of the dominant attribute of this Iron Age culture, it was desirable to go into the details of their chronology. On the basis of comparative stratigraphy and radiocarbon determinations, the lower limit of the PGW at Atranjikhera, Jakhera, Pariar, Noh and Jodhpura (where the PGW is preceded by a distinct phase of black-and-red and black slipped wares) can be assigned to *circa* 800 B.C. But sites like Hastinapura, Ahichchhatra, Mathura, Batesvara, Kampil and Kanauj etc., which do not give the evidence of any pre-PGW phase, cannot be dated earlier than seventh-sixth centuries B.C. The ^{14}C dates from Jodhpura, Hastinapura, Allahapur and Tilaurakot (in Nepal) did suggest that PGW continued up to 350 B.C. Consequently this time-bracket of the PGW from *circa* 800 B.C. to 350 B.C. will also date the chronological span of the Early Phase of Iron Age of the Upper Ganga Plain. Incidentally this is consistent with the terminal date of 800 B.C. proposed for the end of the chalcolithic culture and the introduction of iron or the beginning of the Early Phase of Iron Age with which the use of PGW indisputably starts.

Regarding the lower limit of the Early Phase of Iron Age of the Middle and Lower Ganga Plains we should look for the dates of the so called pre-NBP and NBP Periods. Combining the stratigraphical as well as radiocarbon dates in respect of sites which yielded NBP, we find that the whole 'NBP Period' (Early and Late Phases of NBP) could be bracketed from 7th-6th centuries B.C. to 100 B.C. or to the beginning of the Christian era. The evidence from Prahladpur, Rajghat, Sonepur and Chirand indicates that the so called pre[1]-NBP deposit immediately precedes the Early Phase of NBP. Since this pre-NBP deposit seems to have a life ranging from 100-200 years, the beginning of the Early Phase of Iron Age in this part of the plains may also go back to eighth century B.C. On the basis of the combined evidence of both PGW and NBP it does seem reasonable to assign a time-bracket of 800 B.C. to 400-300 B.C. to the Early Phase of Iron Age which precedes the Late Phase of Iron Age or the Late Phase of NBP having a time-span of 400-300 B.C. to 100 B.C. or to the beginning of the Christian era.

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[1] We now feel that the term 'pre-NBP' could be misleading because it creates an impression that a chronological gap exists between the pre-NBP deposit belonging to 800-700 B.C. and the Early Phase of NBP belonging to 700-600 B.C. The material which immediately precedes the Early Phase of NBP at Rajghat, Prahladpur, Sonepur and Chirand along with iron and which corresponds with the PGW phase of the Upper Ganga Plain belongs to Early Phase of Iron Age or Early Phase of NBP Period assignable to 800 B.C.

Incidentally this study also throws light on the temporal relationship between PGW and NBP. NBP originated about a century after the arrival of the PGW in about 800 B.C. in the plains. The two coexisted from 7th century B.C. to 400-300 B.C., after which PGW completely disappeared. Thus by about 400-350 B.C., NBP completely replaced PGW every where and continued with a considerably decreased popularity till 100 B.C. or to the beginning of the Christian era. Our findings are, therefore, not in conformity with those who believe that PGW and NBP had contacts towards the end and also not with those who think that NBP originated sometime during the mid life of the PGW[1]. The longevity of PGW in the Ganga Plains was certainly less than NBP.

In major part of our study, we have discussed in detail the various cultural elements of the PGW, Early NBP and Late NBP Periods. It may be recalled that we set out to answer two questions : (1) What are the points of interrelationship between PGW and the Early Phase of NBP Periods; and (2) How does the Early Phase of Iron Age (viz., PGW and Early NBP) differ from the Late Phase of Iron Age or the Late Phase of NBP, and what is its role in the ushering of the second urbanization in India, if any ? With reference to the first question, our study shows that these two separately treated deposits, the PGW and Early NBP, did show a rapport between them. We have noted the following common traits :

(1) Irrespective of the fact that the compact zones of PGW and early NBP deposits was Upper and Middle Ganga Plains respectively, they belong to the same alluvial zone of the Ganga Plains which has its own entity.

(2) Stratigraphically and chronologically both these precede the Late Phase of NBP and succeed the chalcolithic culture.

(3) The chalcolithic elements continue to exist significantly in both these deposits even after the introduction of iron. The date of the introduction of iron is also remarkably similar in both.

(4) Maximum spread of their habitation was seen on the bank of Ganga.

(5) In the beginning, the settlements were moderate in both. They were living in small villages in which the size of population was moderate as well as sporadic. Evidence of *kaccha* road, privies and soakpits without any terracotta lining are found in both the periods. Remains of walls of mud and floors of mud with post-holes are noticed in both these periods.

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[1] D.P. Agrawal emphasised that NBP and PGW are distinctive traditions, though having contacts towards the end. See D.P. Agrawal, *The Copper Bronze Age in India*, (New Delhi, 1971), p. 244. D. Mandal thinks that NBP originated sometime during the mid life of the PGW. See D. Mandal, *Radiocarbon Dates and Indian Archaeology*, (Allahabad, 1972), p. 194.

(6) Embankment of mud as a flood protective device is noticed in the PGW deposit at Jakhera, Atranjikhera and Kampil and Early Phase of NBP at Kausambi, Rajghat and Pataliputra. Moat/diversion channel is also noticed in the PGW level at Jakhera and Early Phase of NBP at Kausambi and Rajghat.

(7) Copper continues to occur even after the introduction of iron. The agricultural implements and objects of war and defence and structural use are totally absent in both these deposits. Hunting tools like arrow-heads are rare. Pots and utensils are absent. Objects of toiletary and household use, e.g. pins, needles and bangles, are common to both. The distinctive type of both these phases are the antimony rods.

(8) Though no copper smelting is attested, the copper metallurgy does show resemblance in chemical content. Copper objects from these phases give the evidence of unalloyed copper ranging in content from 95.45% to 98.43% with impurities of tin, lead, arsenic, nickel and zinc.

(9) The abundance of iron objects from the very beginning of PGW and Early NBP Phases imply a period of evolutionary development, pushing the beginning of iron further backward in point of time. The view that PGW people were the earliest users of iron and that limited use of iron was known to them also does not hold good now.

(10) The inventory of iron objects from both these periods is more or less the same. Their tool-kit shows a hunting bais because arrow-heads and spear-heads are most prolific and may be regarded as the distinctive types. The tools of war and defence and of specialized nature such as sickles (found at Baruaih and Jakhera), spear-heads and dagger (only found at Jakhera), are very rare. The pots and pans are totally absent from both these phases.

(11) So far none of the iron objects from the PGW phase has been chemically analysed. But the objects analysed from the Early Phase of NBP show that the metal was pure. Majority of objects have carbon content of about 0.2% and hence they do not qualify as modern steel. However the find of large number of ores, slags and finished objects in both these phases, evidence of smelting and forging of iron objects from Jodhpura (Rajasthan) and the presence of iron ores in Vindhyan and Bihar regions do show the scope for the development of iron technology in the plains.

(12) The entire range of the associated wares in the PGW and Early NBP Phases comprises mainly of four ceramics: (1) the plain grey ware; (2) the black slipped ware; (3) the black-and-red ware; and (4) red ware. These associated wares are similar in fabric and shapes in both these phases. If we remove PGW and NBP respectively from the PGW and Early Phase of NBP, it will be difficult to differentiate between these two deposits.

(13) A few paintings on black-and-red and black slipped wares found associated with the Early Phase of NBP is an extrapolated feature in the plains. Similarly PGW in the Ganga Plains is also an intrusive trait. The PGW, while it moves towards the east of the plains, tends to peter out and its frequency beyond Sringverapura is almost nil. Similarly

black slipped ware and NBP are easterly tradition. The NBP, while it moves towards west, tends to peter out and beyond Sravasti its frequency is almost nil. The overlap phase of PGW and NBP explains the contact of these two wares. Thus in the independant phase of the PGW in the Upper Ganga Plain, we do not get a single sherd of NBP, while in the Early Phase of NBP on some sites we do get PGW in limited number. This shows that PGW was an elder contemporary of NBP and coexisted with it for a much longer time than hitherto imagined. Even though the PGW and NBP have their own distinct identity and different distributional zones, yet they have influenced each other. This is brone out by various similarities which we find on both these wares.

(14) PGW and NBP are not single homogeneous type of wares produced out of a single technique. They have outgrown their definition, so much so that under them several other types also find their affiliation. But if we compare the top-graded NBP (our Fabric A of NBP) with the top-graded PGW (our Fabric A of PGW), we notice that both these wares are made of the same alluvial clay of the Ganga, thin in section, fired under reducing condition resulting in grey core, and show similar tradition of shapes in which the heavier vessels are completely absent. The common pattern of producing thick and thin horizontal bands, vertical strokes, vertical strokes coming out from a horizontal rim band, transverse band or stroke and simple circular bands or arches, all common in PGW are also noticed in biochrome varieties of NBP. The difference is confined only in the mode of surface treatment, the painting of the PGW giving way to the slip decoration in NBP. Such similarities clearly show the physical interrelationship between PGW and NBP. Specific mention may however, be made of a sherd found in the Early Phase of NBP at Sringverapura Period III which had a fine grey ware fabric with paintings on the interior with black lines. It had a typical NBP finish on the exterior over which a row of sigmas was further painted in black.

(15) Vase-shaped or *ghata*-shaped circular beads of terracotta which are distinctive type of the PGW phase, are also reported from the Early Phase of NBP. Long barrel circular beads of agate and spherical beads of carnelian are common to both these phases.

(16) Terracotta human figurines, which can broadly be placed in the vague and ageless category of 'Mother-Goddess', and which were known from the Early Phase of NBP, are now also reported from the PGW phase of Jakhera. These are noted for having stumpy arms, thin waist and fiddleshaped lower part. Among the animal figurines bull has been reported from both PGW and NBP phases.

(17) The prolific bone points, variously described as arrow-heads, styluses, awls, pins, knitting needles, bone tools and potter's tool, are one of the diagnostic trait of the PGW culture. These are also reported in large number from the Early Phase of NBP. It may be added that in the absence of any known writing from these phases it is difficult to agree with those who think that these were also used as styluses.

(18) Glass bangles, copper rings, terracotta balls and cones and pottery discs are found in both the phases.

(19) Terracotta discs, another diagnostic trait of the PGW culture are also found in the Early Phase of NBP.

(20) Terracotta pestles or grinders with multi-coloured stones set into the clay are another distinctive type of the PGW. These are also found in the Early Phase of NBP.

(20) The economy of the two cultures, PGW and Early NBP, was essentially a rural one, based mainly on agriculture but often supplemented by hunting and fishing. Elements of urbanizations, such as town-planning, use of baked brick structures, system of coinage, writing and long-distance trade, etc., are absent in both.

From the forgoing evidence it is apparent that the PGW culture of the Upper Ganga Plain did not exist in complete isolation from their contemporaries pre-NBP and Early Phase of NBP culture of the Middle Ganga Plain. The analogies between the two are not only of general kind but also of specialised nature. Inspite of these similarities, the difference between these two groups of culture are quite marked. Some of the traits of the PGW culture, like multiple brush technique of painting in black pigment, some specialized and uncommon floral and geometric designs of painting, representation of horse and dice are not to be found in the Early Phase of NBP. This leads one to believe that :

(1) Until horizontal excavation of PGW and Early NBP sites in the pertinent regions are not done, we will not be in a position to state clearly which trait were borrowed by NBP or which were borrowed by PGW culture. It is quite likely that the trait at both these cultures may be derived from a third common source.

(2) By about seventh century B.C. when the two disparate groups met, knick-knacks exchanged between the two and the common external influence was modified quite substantially to produce a composite culture which is popularly termed as PGW in the Upper Ganga Plain and Early NBP culture in the Middle Ganga Plain. This is how in these two assemblages the unity existed only in diversity.

(3) This also puts the PGW culture of the Ganga Plains on different footing from its counterpart in Punjab and Haryana.

(4) This composite culture, which evolved out of knick-knacks exchanged between the so-called PGW and the NBP cultures, may be called as the first phase of the Ganges civilization. We have already noted above twenty common characteristic in the civilization. We, therefore, feel that while the terms PGW and NBP cultures may sometimes be used for this civilization, yet it may be preferable to drop them in the context of the Ganga Plains, because there they are 'PGW and NBP types' and not PGW and NBP cultures. In the Ganga Plains, the PGW is an extrapolated feature. For the real PGW culture one should look to the Ghaggar (Saraswati). Drisadavati (Chautang) and Sutlej basins.

It may be, however, pointed out that none of the sites of the Upper Ganga Plain has produced all the twenty one characteristics (as enumerated above) in a single assemblage. Similarly, none of the occupational levels of the Middle and Lower Ganga Plains of the Early Iron Age has so far yielded all these items in a single assemblage. These items have been picked up from different sites and are found in different combinations. This clearly shows that these items formed part of a process and the unity of this civilization is due to the ecological and geomorphological set up of the vast alluvial plains of the Ganga. The PGW people who came down the Upper Ganga Plain with their distinct pottery tradition could hardly retain their *status quo* and survive beyond a generation or two. New opportunities and new challenges, which differed from those in their original place in Punjab and Haryana, seem to have soon remoulded them in such a way that except a few survivals of their *deluxe* pottery and a few characteristic objects, nothing of the original has survived for the archaeologist to reconstruct the PGW culture as a whole.

The changes which took place around *circa* 700 B.C. due to the fusion of these two disparate groups of cultures was remarkable as compared to the preceding chalcolithic culture characterized by the use of black-and-red and black slipped wares. Many new daughter settlements cropped up, resulting in the extension of the settlement area due to perceptible growth in the population. Clay embankments and moats were constructed as flood protective device. Baked bricks were used on a very limited scale for ritualistic purposes. Individual houses had their own sanitary contrivances, for the disposal of sewage and excreta, in the form of refuse pits, pit-latrines, soakpits (without any terracotta linning) and *kaccha* drains. The introduction of cheap iron democratised agriculture and industry. Blacksmith's furnace, pottery kiln and several types of open and closed mouth hearths suggest that the life was settled. Not only copper, bone and miscellaneous object of terracotta were produced in large number but the presence of large number of iron objects along with slag indicate that probably there existed a separate class of iron smelters. The archaic stumpy figurines were given a black lustrous slip similar to that of NBP. Thus the change was from restricted agriculture to the extensive agriculture, from almost no economy to self-sufficient economy of trade and commerce and from static life to regional movement of the people and material. The open villages of the preceding chalcolithic phase were converted into the closed towns of this civilization. These were the directional changes in the cultural pattern of these people. It, however, does not mean that from the very beginning these changes led to the formation of a single culture. It has not happened. Practically both these cultures kept close contact with each other, sharing elements in a way that it is extremely difficult to determine as to which of the elements belonged to which of these cultures, except through quantitative analysis which requires more work.

Now we shall proceed to answer the second question posed by us, viz., how does the Early Phase of Iron Age (*i.e.* PGW and Early NBP) differs from the Late Phase of Iron Age or Late Phase of NBP and what is its role in the ushering of the second urbanization in India, if any?

The Mature Phase of the Ganges Civilization :

As the time rolled on, there was a marked evolution in the material culture of the people in the Late Phase of Iron Age by about *circa* 400-300 B.C. The Ganges civilization, with some sort of beginning in the Early Phase of Iron Age round about *circa* 700 B.C., was in its full bloom during this period. There are definite indications of an advanced cultural prosperity, such as backed-brick houses, monumental buildings of public utility, elaborate sanitary arrangements in the form of ring wells, baked brick drains, fortifications against enemies, long distance trade on a substantial basis, system of coinage and artistic objects, etc , all of which clearly suggest another step forward towards urbanization. During this period the products of this civilization were not only confined to the Upper, Middle and Lower Ganga Plains but were easily distinguishable even beyond its limit. So far more than four hundred and fifteen sites have produced the assemblage which can be associated with this phase. Thus this civilization can now claim a larger area than any other of the known Iron Age cultures of India and perhaps even greater than the well known Harappa culture[1]. Precondition for the establishment of cities was fulfilled in the village cum town economy of the early phase of this civilization as detailed above and some cities did rise during this mature phase of the Ganges civilization.

Our study has shown that the people of the early as well as mature phase of the Ganges civilization do not belong to different cultural groups and had not come from elsewhere and occupied the Ganga Plains. Instead, they are of the same stock.

The overwhelming evidence from all the sites clearly show that the early phase always precedes this mature phase and, except Hastinapura[2], which stands out in sheer isolation, there is no time-gap between the two. Also there is a distinct overlap and in fact on certain sites it is difficult to pinpoint the stratum where the one ends and the other starts. So the mature phase of this civilization was not born in isolation. Much of what existed in its early phase goes into the make-up of the same culture emerging at that particular moment and in that locale and soon assumes a new form in the new mould. The words early and mature have, therefore, only one implication, which is that they are aspects or phases of the same culture, one appearing prior to other in point of time, the mature deriving elements from the early and culminating in an evolutional trend. Let us see now how far the essential material elements of the mature phase were anticipated by early phase.

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[1] Sir Mortimer Wheeler in *The Indus Civilization*, (Cambridge, 1968), pp. 138-140, has listed about one hundred (?) Harappan sites out of which seventy have produced significant elements of the Harappa Culture. B.M. Pande and K. S. Ramchandran in *Bibliography of the Harappan Cultures*, (Florida, 1972), pp. 37-43, list two hundred and fifty odd Harappan sites, and S.R. Rao in *Lothal and the Indus Civilizaiion*, (Bombay, 1973), pp. 195-202 has listed two hundred and twenty nine Harappan sites. All these numbers, however, are much less than our 'NBP list' of four hundred and fourteen odd sites. See T. N. Roy, A Study of Northern Black Polished Ware Culture, (An Iron Age culture of India), Unpublished Ph. D. thesis, Banaras Hindu University, 1977, Appendix-I.

[2] We have already pointed out as early as 1964-65 that there are no valid grounds to postulate such a long gap of 200 years between PGW and NBP Periods of Hastinapura. Only a small portion of the settlement was abandoned for a short time due to floods in the Ganga, the evidence of which we get only at Hastinapura I and not at other trenches. It may be only a local phenomenon. The evidence also indicate that it was not a cultural gap. See, T.N. Roy, "Stratigraphical Position of the PGW in the Gangetic Valley", *Bharati*, no. 8, Part II, (Varanasi, 1964-65), p. 68. B.B. Lal, however, in 1980 emphasized that, "The postulation of such a time lag would not have been necessary had a different cultural group come from elsewhere and occupied the site'. See, B. B. Lal, 'Did the PGW continue up to the Mauryan Times', *Puratattva*, no. 9, 1977-78, (New Delhi, 1980), p. 71.

By this time, PGW completely went out of use. However its place was taken up by another grey ware which was generally much coarser and thicker in fabric than its predecessor PGW of the early phase. There were, however, some additional shapes in the grey ware of this phase, but since bowls and dishes were common to both, a generic relationship between the two cannot be denied. Top-graded NBP (Our Fabric A) with its very high technological skill continued to hold ground, but its frequency was less in this phase. The common pottery of everyday use was coarse grey ware and coarse NBP (Our Fabric E). There seems to be again a generic relationship between top-graded NBP of the early phase and coarse NBP of this phase, since bowls and dishes were common to both. There were, however, several additional shapes in this phase, *viz.*, carinated *handi* etc., the type also found in coarse grey ware. Further, during this phase, the ceramic technology of producing lustre travelled to distant places. Top-graded NBP was so much valued that broken pieces were joined by copper rivets and NBP technique is seen being applied even on the sherds of the red ware group. Perhaps there was very little movement of finished pottery from one centre to the other. Instead, there was a dispersal of technique or the formula for producing gloss on pottery from the Middle Ganga Plain to some outlying areas, which were simultaneously producing NBP on a sufficiently large scale.

In architecture, there was a tendency to discard the building materials like mud and mud-bricks, but complete switch over to the more durable material like baked bricks was not made. Kiln-burnt bricks have been found in the early PGW phase at Hastinapura, Ahichchhatra and Jakhera (also at Bhagwanpura, Daheri, Kasital and Sanghol, all outside the Ganga Plains) but their use in the building construction has not been attested. In the mature phase which we are discussing, the baked bricks were of comparatively large size (Table I) and their extensive use can very well be regarded as the index for major building activities. Barns at Hastinapura and Nevasa, surface drains at Hastinapura and Rajghat, a channel, well and a massive underground reservoir at Ujjain and a perplexing discovery of about 75 m long retaining wall of a large tank at Ropar, testify to this fact. At Rajghat, a baked-brick house complex consisted of two rooms, having two door-ways, a small vestibule, a domestic well, a bathing platform and an attached drain. The average size of the rooms discovered was 2.56 × 2.26 m and 1.90 m × 2.92 m. Baked bricks were also used in strengthening the ramparts with revetments and in the construction of *stupas*.

400–300 BC

In the mature phase of the Ganges civilization, the high sense of sanitation exhibited by the people was remarkable. Pit latrines of early phase became infeasible in a densely populated urban settlements. As the socio-economic status of the people improved, they switched on to ring well—an improved variety of sanitary contrivances in which the circular pits were always lined with terracotta rings. These ring wells, so characteristic of this phase, were not only used as latrines but also as draw-wells and soak-pits. These are widely distributed throughout the sub-continent both in time and space and are even now being used in some parts of our country. Perhaps this evidence is of added significance when we notice that it is this culture which with its various other elements of urbanization left some of its imprint on future Indian civilization. Individual houses had yet another arrangement for the disposal of dirty water. Several large storage vessels were placed vertically one above the other in a pit and the bottom of each was perforated so that the sullage water may pass freely into the ground. This type of soakage-arrangement has been reported from Hastinapura, Rajghat, Vaisali, Prakash and Tamluk. Drains either of baked bricks or terracotta pipes or of stone, to drain out the dirty water from the sizeable part of a town, are also found in this phase.

In contrast to clay embankments meant to protect the habitation from floods in the early phase, we have ramparts in this phase meant exclusively for defence against enemies. Pataliputra and Kausambi can be taken as examples where the clay embankments of the early phase were converted for defence purposes with certain modification carried out in this phase. The archaeological evidence in regard to these fortifications points to the evolutionary trend from early to mature phase.

Among copper objects, the distinctive antimony rods of the early phase continued to occur. But this phase was noted for objects of ornamental use along with pots and utensils. Of singular interest is a shallow dish of copper decorated on the innerside by a concentric groove. This is a new corroborative evidence of typical earthen ware pots having their prototypes in metals.

With the comparative abundance of iron objects, it appears that the life of the people became more dynamic. The increasing use of weapons of war and defence, like spear-heads, daggers, axes, blades, lance, javeline, caltropes, drills, adzes and *khadga* shaped knife points to the fact that people were more equipped than before. On the domestic front, there appeared various utensils like bowls, spoons, vases and saucepans with loop handles (prototype also found in earthen wares). In the field of architecture, the momentum in the construction of buildings was brought about by various iron objects like nails, clamps, door-rings, bells, fish-plates, lamps, door-fittings and fragments of door chains and hooks, etc. Tools for specialized jobs, like sickles and spades for agricultaral purposes, smith's anvil and tong, crucibles, adze, chisels and knives for carpenters and mouth pieces of bellows for blacksmith's etc, were also found. Probably the people of this phase could produce agricultural surplus required for the development of these specialized metal crafts. This efflorescence in iron-working at some sites is indicative of a quickening pace of urbanization.

Copper metallurgy made some headway during this phase. In contrast to the early phase, the copper objects show the use of tin and zinc alloying to improve its casting properties and also its hardness and strength. Copper objects analyzed from Rajghat, Sonepur, Taxila and Prakash contain more than 5% of tin-alloying and hence can be placed in the category of bronzes. Copper-zinc alloying from Taxila and Prakash shows that brass was also made during this phase.

Iron was comparatively more pure in this phase as is evidenced from Prakash and Dhatva samples. The use of calcium compounds as a flux in the smelting of iron is evidenced only during this phase. Alhough the wrought iron was in use from the early phase of this civilization it could not get the real breakthrough unless the process of carbonization and steel-making could be worked out in this phase. Smelting and manufacture of iron objects is better illustrated at Ujjain during this phase.

Bead-making also saw all round progress. Among the terracotta, the vase-shaped (*ghata*-shaped) beads of the early phase continued to occur, but arecanut shaped beads were introduced only during this phase. The origin of etched beads of agate and carnelian may be attributed to the people of this mature phase. Bone beads continued to occur but the shapes in the glass beads became more varied. The remains which could be identified with the manufacture of beads have been found on sites like Broach, Jaugada, Ujjain Kausambi and Rajghat, the most noteworthy being at Ujjain.

For the exchange of commodity, perhaps barter system was in vogue in the preceding phase. With the growing prosperity and volume of exchange of goods people might have experienced considerable difficulty in this system. This led to the introduction of the system of coinage in India for the first time. Punch-marked coins, both in copper and silver, and uninscribed cast coins, exhumed in large number from almost all the sites, at once removed the old uncertainty as to the medium of exchange. Seals and sealings reported for the first time in this phase also helped in augmenting the volume of trade. Perhaps the organizations of trader's guild introduced this system of exchange.

Weights of different denominations also indicates that trade and commerce began to flourish. Cylindrical weights of different sizes, made of steatite, jasper, agate, chalcedony and terracotta have been found at Sonepur, Vaisali, Chirand and Jajmau etc.

Terracotta art, jewellery, toiletry, as well as objects of amusement and recreation, also show development and greater variety. Antimony rods of copper continued to occur. Skin-rubbers and head-scratchers of terracotta, ivory and bone, hair-pins of bone and ivory, perfume caskets, pigment sticks of bone and ivory, caskets of bone and combs of ivory often rivetted with copper pins are the noteworthy objects of this phase. Dices, balls and pottery discs and gamesmen, all of terracotta, continued to be the objects of amusement and recreation. Dices were also made of bone and ivory. Such objects reflected then, as they do even now, that the people were leading a luxurious life.

Agriculture continued to be the main source of people's livelihood. But due to increase in the population and other facilities vast areas were brought under cultivation. Land was irrigated by tanks and wells. Side by side people also practised hunting and fishing as they used to do in the early phase. Rice, no doubt, was known in the early phase but wheat and pulses were added in the dietary system of the people. The above named cereals found at Nevasa and Ter testify to this fact. That wheat was grounded into flour is confirmed by the discovery of several types of querns and mullers. An improved type of quern with one end projecting beyond the axis with a view to let any grinded material fall into the dish kept below the projected end owe its origin to this mature phase. Examples of this type of saddle-quern have been reported from Prakash and Nasik. Muller were round or cylindrical in shape and were either of red sandstone or basaltic trap.

Thus we see that several material elements of this mature phase of the Ganges civilization were anticipated in the early phase. The mature phase deriving several elements from the early phase seems to be culminating in an evolutionary trend. It impinges on the scene apparently full-blown by about 400-300 B.C. and remains so till about 100 B.C. or the beginning of the Christian era, when it is succeeded by a different culture of the Saka-Kushan Period. An efficient village cum town economy of the preceding phase with agricultural surplus, metal-cum-ceramic technology and an organized social structure could burst into urbanization. The upsurge, during this period, is quite evident in the variety and richness of the material remains. Inspite of being extensive, it is homogeneous and has got its own individuality. The extensive trade contacts and the alien influence did not make any serious inroads on its individuality. The effective enforcement in the production of standardized goods throughout the vast country of India pre-supposes the existence of a strong central political authority. A considerable portion of the country, no doubt, was on the threshold of urbanization. The sites which can be categorized as urban are Hulas, Hastinapura, Ahichchhatra, Mathura, Atranjikhera, Kanauj, Hulaskhera, Sravasti, Pariar, Sringverapura, Kausambi and Bhita (all in the Upper Ganga Plain) ; Ayodhya, Piprahwa, Sohagaura, Rajghat (Varanasi), Masoan, Buxar, Khairadih, Chirand, Vaisali, Sonepur, Patna, Kankarbagh, Rajgir, Apsad, Balirajgarh and Champa (all in the Middle Ganga Plain) ; Bangarh, Tamluk and Chandra-ketugarh (all in the Lower Ganga Plain) ; Broach in Gujarat ; Ropar, Sugh, Sanghol, Autha and Taxila (now in Pakistan) in Punjab and Haryana ; Prakash and Nevasa in Maharashtra ; Ujjain, Eran, Tripuri and Besnagar in Madhya Pradesh ; and Noh in Rajasthan. All these sites fulfil almost all the criteria of a city as laid down by Childe and other scholars[1].

It is important to note that several sites even in the mature phase of this culture were not urbanized. These sites remained village settlements throughout their period of occupation. The sites which would fall in this category are Alamgirpur, Allahapur and Kesari (all in District Meerut *i.e.* near the urban site of Hastinapura) ; Khalaua and Batesvara in

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[1] All these criteria has been discussed in detail in author's Ph. D. thesis, 'A study of NBP Ware Culture (An Iron Age Culture of India)', which will be published shortly.

Agra, near the urban site of Mathura-Sonkh; Jakhera in District Etah, near the urban site of Atranjikhera; Kampil in District Farrukhabad, near the urban site of Kanauj; Manwan and Jajmau respectively in Districts Sitapur and Kanpur; Kashipur in Nainital; Bharadvaja Asrama and Koldihwa in District Allahabad, near the urban sites of Kausambi and Sringverapura; Nandigrama near the urban site of Ayodhya; Sarai-mohana, Prahladpur, Takiaper and Kakoria (all in District Varanasi and near the urban site of Rajghat, Varanasi); Lakhneswardih in District Ballia, near the urban site of Khairadih; Chechar Kutubpur in District Vaisali near the urban site of Vaisali; Chandahadih and Katragarh in District Muzaffarpur; Oriup in District Bhagalpur; Mahisdal, Pandu Rajar Dhibi, Bharatpur and Tulsipur in West Bengal; Nagda in District Ujjain, near the urban site of Ujjain; Navdatoli, adjacent to the urban site of Maheshwar; Nagari in Rajasthan; Avra in Madhya Pradesh; Jaugada in Orissa and Banjarahi in Nepal. Most of these sites were away from the main trunk route and were mostly not situated on the bank of important rivers having perennial source of water. Some of them were, therefore, even deserted after this mature phase of civilization. So we find that even during this mature phase, major section of the population continued to be rural. The glamour of some cities could not change the predominently rural character of the Ganges civilization of India. Indeed, it is this culture that laid the real foundation of our future Indian civilization, whereas the Indus civilization, which gave the Indian sub-continent its first cities, after a sudden efflorescence, gradually withered away in the alien ecology of the Ganga Plains, leaving perhaps, only a few stamps on the future Indian civilization.

Origin of Ganges Civilization :

We have seen that the earlier phase of the mature Ganges civilization has been clearly distinguished in the Ganga Plains by a composite culture evolved out of the amalgamation of the so-called PGW and Early NBP cultures both belonging to the Early Phase of Iron Age. Any pre-iron Age cultures which can be claimed as the ancestor of the Ganges civilization must fulfil three conditions : The first condition is that stratigraphically it should precede it. Secondly it should also overlap with it and thirdly the essential elements of this civilization must have been anticipated by that culture. Let us see which of the pre-Iron Age cultures of the Ganga Plains satisfy all these conditions.

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Ganga Plains now have given ample evidence of the presence of stone age cultures. Recent field work has revealed several Neolithic sites out of which Koldihwa, Mahagara, Panchoh, Chopani-Mando, Chirand and Chechar Kutubpur give an idea of the transformation from the advanced hunting to food production. These also suggest that there was no nuclear zone from where the idea of food production diffused to other centres.

There are now definite evidence of the penetration of the Harappa culture in the Upper Ganga Plain not only at Alamgirpur on the Hindon but also at Baragaon on Maskara and Hulas on the Katha Nala. Systematic survey in this region has revealed up till now more than sixty Harappan sites which are confined only in the vicinity of the Yamuna and its tributaries It is, however, significant that no site could claim the status of a town or city. Obviously, thus, in this region of the Upper Ganga Plain, one meets the last lingering phase of the Harappa culture. One does not know if at all this culture contributed to the subsequent cultures of the region, for there seems to be a break of occupation after the Harappa culture. Secondly, the Harappans did not cross the Ganga and their impact was never felt in the Upper Ganga Plain North.

After the Harappans, the next settlers were the users of the Ochre Coloured Pottery, though their link with the earlier Harappa culture is not yet clear. The association of the OCP either on circumstantial or stratigraphical grounds with Copper Hoards is not yet clearly established. At none of the sites did these settlements either of OCP or Copper Hoards last more than a century or so. How and why these settlements came to an end is not clear. Their relationship with succeeding Iron Age cultures is also not clear. As there seems to be a break in occupation after the OCP culture, the comparison made by some scholars with the OCP and the Iron Age cultures is misleading. Instead, to know the impact of one culture upon another especially such sites should be chosen which may show a cultural continuity, in the present case, from the chalcolithic to Iron Age.

There are now definite evidences of a permanent habitation stratigraphically underlying the deposit of the Iron Age settlements in the whole of Ganga Plains. This is in the form of the chalcolithic culture which immediately precedes, the Iron Age settlements marked by the presence of PGW and Early NBP Phases. The chalcolithic culture of the Ganga Plains, despite some local variation in certain individual trait, is broadly homogeneous in its cultural contents. The main ingredients of this culture are :wheel thrown black-and-red and black slipped wares, simultaneous use of copper and very restricted use of stone tools, bone points, stable but poor rural settlements with reed-thatched huts, with agriculture and hunting as the main occupation. The pottery shapes, taking all the wares in consideration, mainly comprise bowls, dishes, basins and medium-sized vases. Pedestalled or footed or bowl-on-stand, lipped bowls or basins, and dish-on-stand are the noted shapes. All these shapes may not be present at every site and certainly not in equal measure. But what is significant in this context is as follows :

(1) There is no break of occupation between the chalcolithic and the early phase of the Ganges civilization, characterized by the use of PGW and NBP. These two cultures overlap with each other and in fact co-existed for sometime.

(2) Some of the elements of the chalcolithic culture, like black-and-red ware, black slipped ware, bone points, copper objects and vase-shaped beads of terracotta continue to exist significantly in the early phase of Ganges civilization even after the introduction of iron. If we compare the typology of the vessels, we find that many chalcolithic forms, like carinated bowls, sub-ovaloid bowls, footed bowls, dish-on-stand, perforated vessels and lipped bowls or basins etc., continue to occur also in the early phase of Ganges civilization. NBP owes its origin in the black slipped ware, PGW also copied many forms of the black-and-red and black slipped wares. On the basis of the compatibility in the inventory of copper objects found in both these deposits some sort of affinity is indicated. The material climate of the Ganga Plains was receptive to the introduction of also iron technology. The chalcolithic people had a knowledge of copper metallurgy. The

Bihar and the Vindhyan region possessed iron ores in abundance. We are here witnessing a transformation of a chalcolithic society into a sophisticated semi-urban Iron Age community groups. With this situation, suitable area and climate, these Iron Age communities had the best scope for profitting from the copper technology of the chalcolithic people. But on the whole there is a marked change in the material prosperity of the Ganges civilization as compared to the preceding chalcolithic culture. Notwithstanding this casual suggestion about the possibility of the preceding chalcolithic tradition of the plains influencing the later Ganges civilization, this aspect of the question needs to be worked out in a greater detail. However, as said in the preface, we cannot easily undermine the role of black-and-red and black slipped wares as the basic representative pottery of a community occupying the whole of Ganga Plains at one stage. On this basal matrix there is a clear intrusion of PGW from the west, which after coming in contact with the users of the black-and-red and black slipped wares lost its independent identity and after sometime amalgated with NBP, which was doing the same from the east, resulting ultimately in the evolution of a composite culture which may be called as the Ganges civilization.

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PLATE 1

Baked Brick structures of Public utility from the mature phase of the Ganges Civilization :

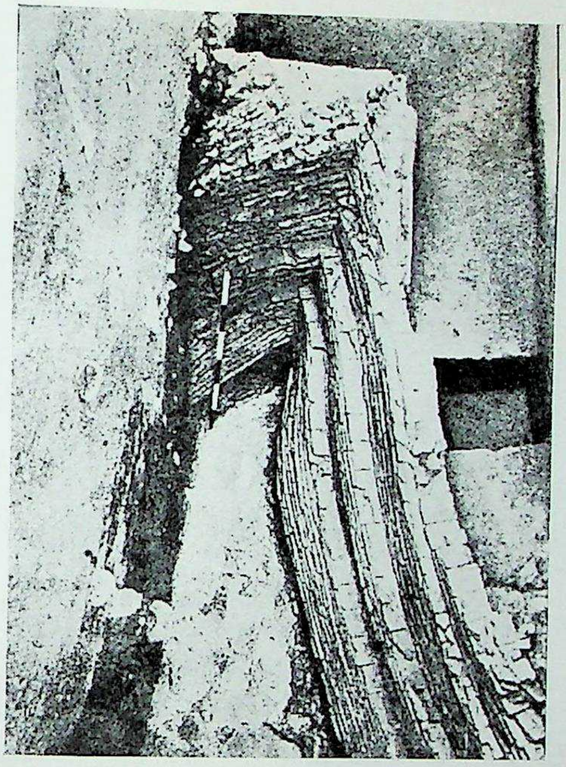
A. Stepped Wall of a tank at Tamluk.

B. Retaining wall of a large tank fed through a baked brick inlet at Ropar.

C. Part of a massive underground brick structure at Ujjain.

D. A baked brick well at Ujjain.

PLATE 1



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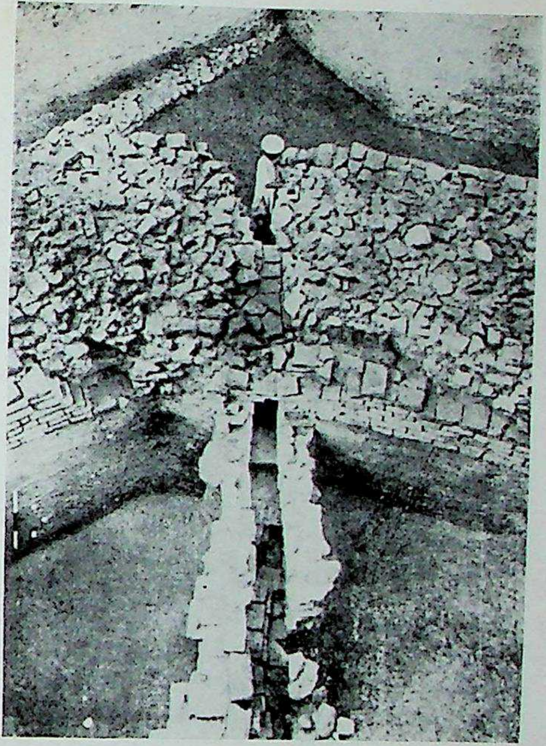

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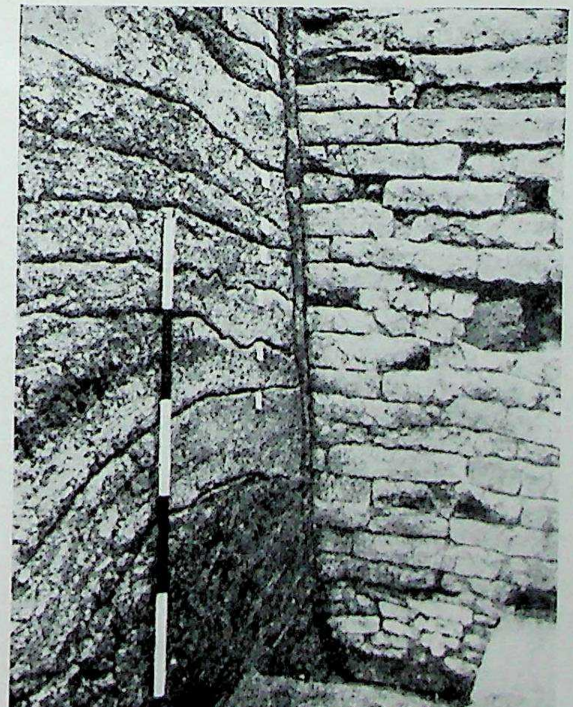

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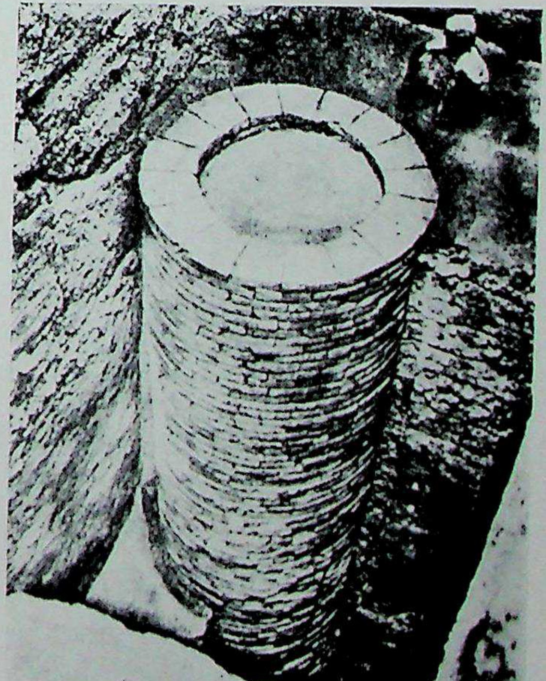

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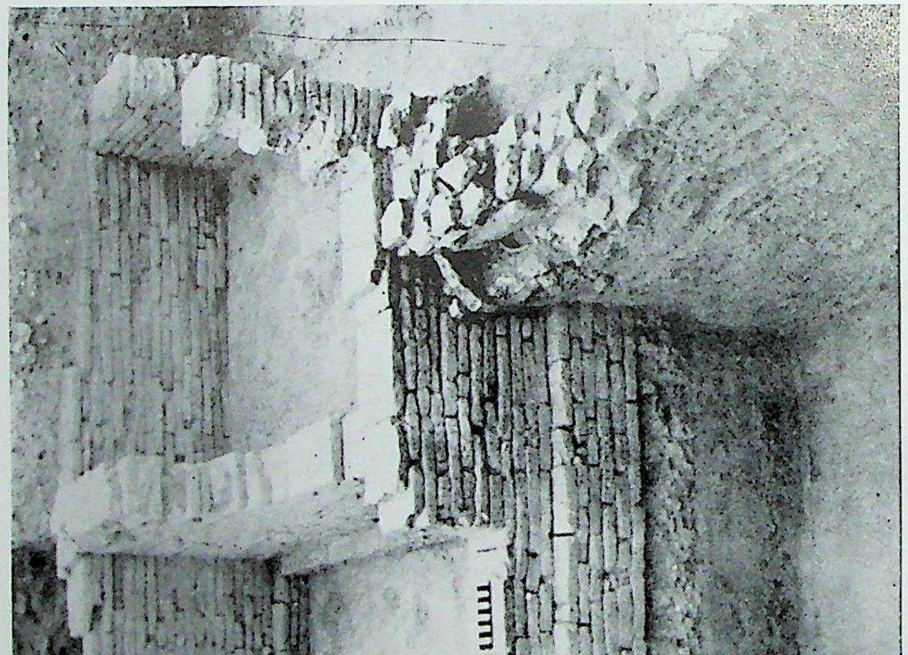


PLATE 2

Use of baked bricks in the construction of Buildings from the mature phase of the Ganges Civilization :

Two rooms, two door sills, plinth and the foundation of a house complex at Rajghat.

PLATE 3

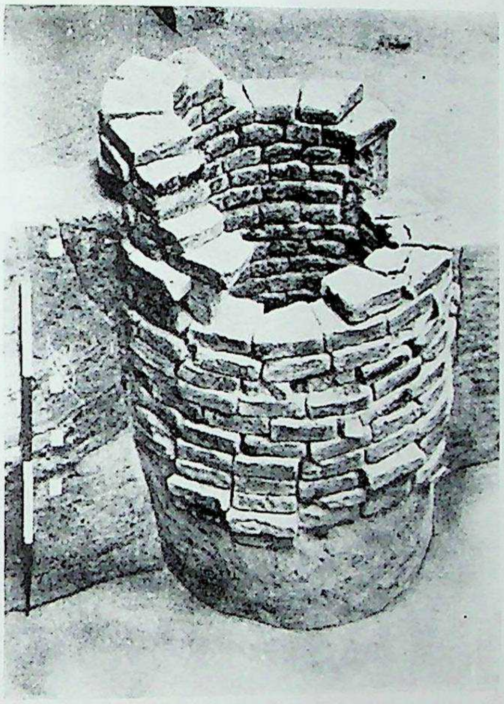
Baked brick structures from the mature phase of the Ganges Civilization :

A. Barn made of wedge-shaped bricks at Hastinapura.

B. A baked brick floor at Atranjikhera.

C. Section of a floor made of rammed pebbles with post-holes at Bahal.

D. An apsidal structure of dressed stones at Ujjain.



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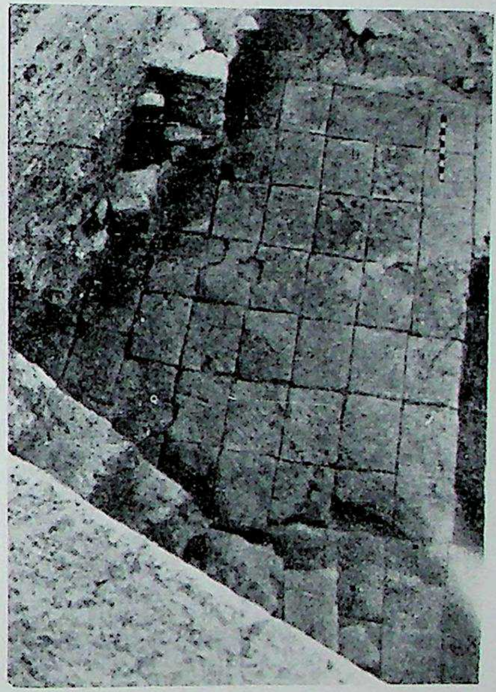

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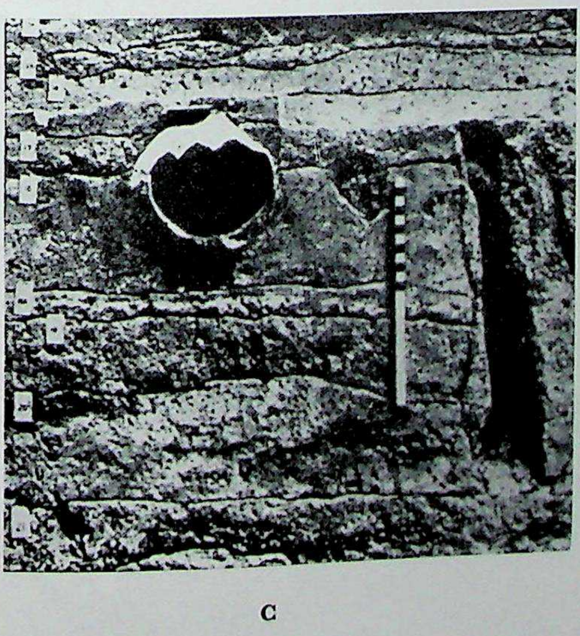

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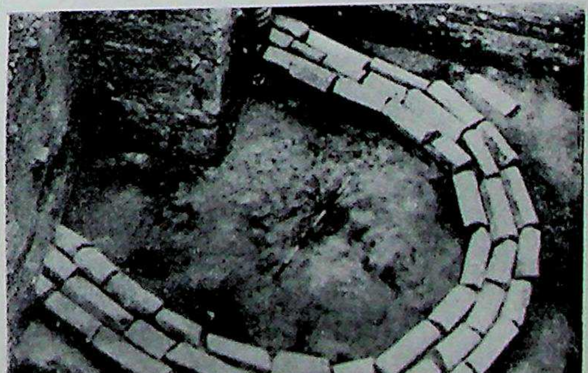

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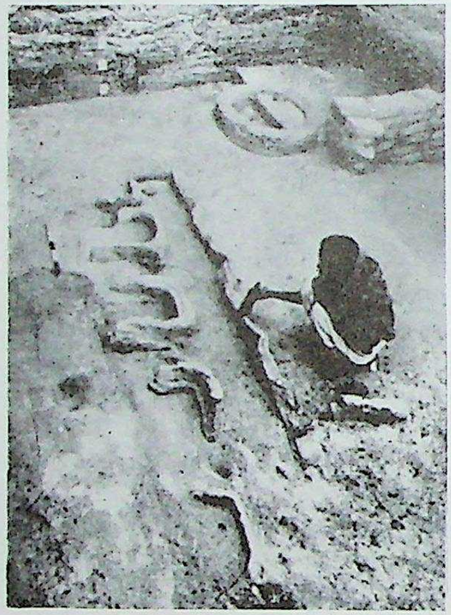
PLATE 4



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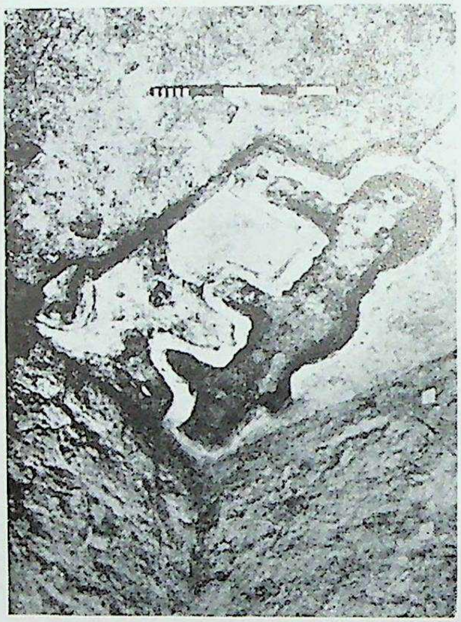

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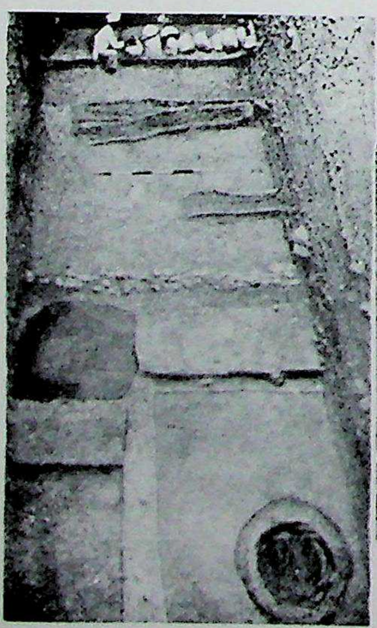

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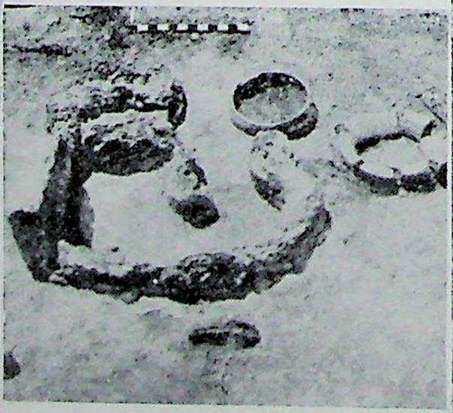

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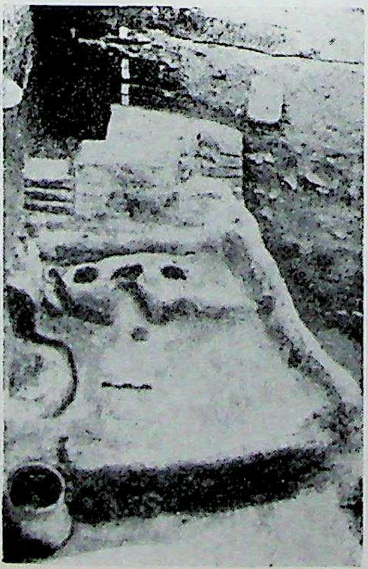

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PLATE 4

Furnaces and Ovens from the mature phase of the Ganges Civilizations :

A. Series of hearths at Purana Qila.

B. Multiple Ovens on mud floor at Ahichchhatra.

C. Long and deep channel furnaces for making beads at Ujjain.

D. Blacksmith's furnace at Ujjain.

E. A peculiar type of hearth with one mouth and three openings exposed on a mud floor at Atranjikhera.

PLATE 5

Ring Wells from the mature phase of the Ganges Civilization :

A. Ring wells at Tamluk (West Bengal).

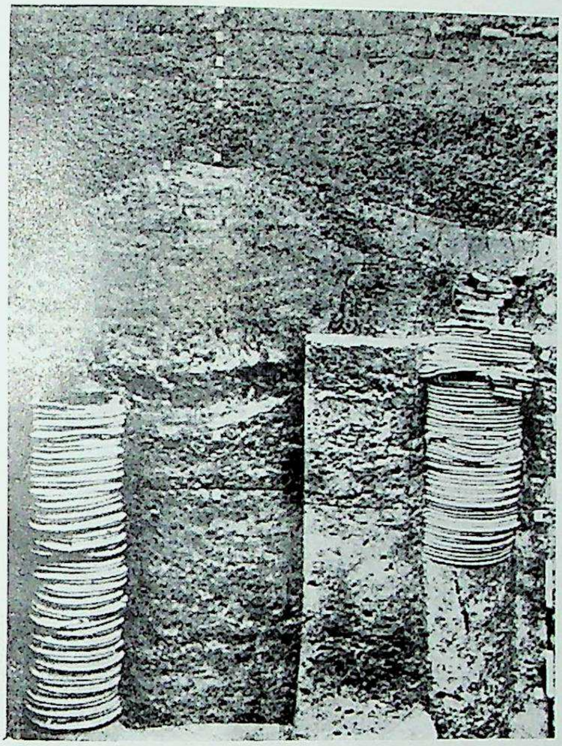
B. Ring wells in close proximity at Sravasti (U. P.).

C. Ring wells at Besnagar (Madhya Pradesh).

D. Two Ring wells in one large pit at Nevasa (Maharashtra).

E. Forty seven rings of a ring well exposed at Hastinapura (Uttar Pradesh).

PLATE 5



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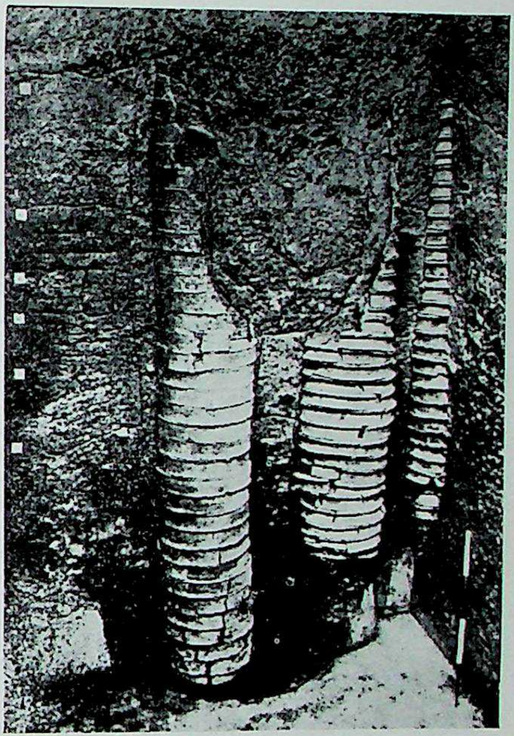

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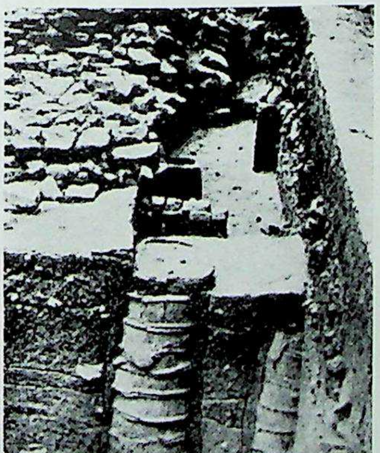

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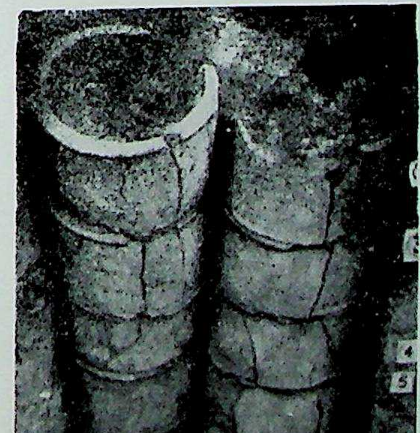

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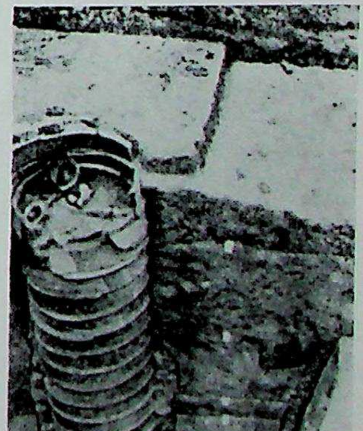

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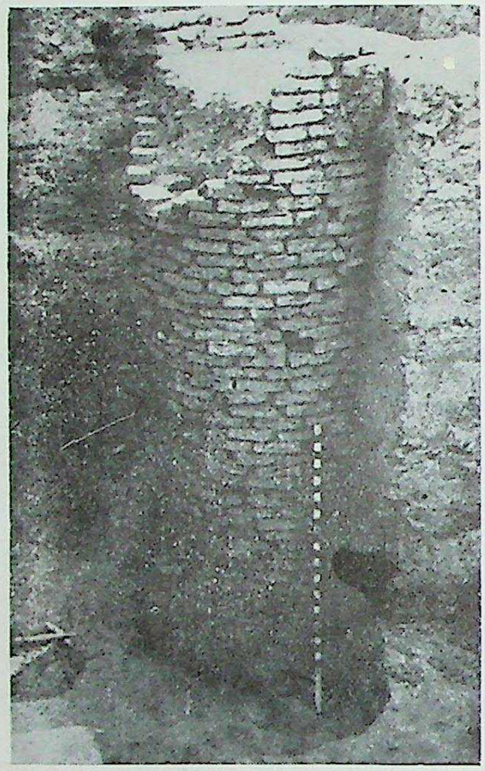

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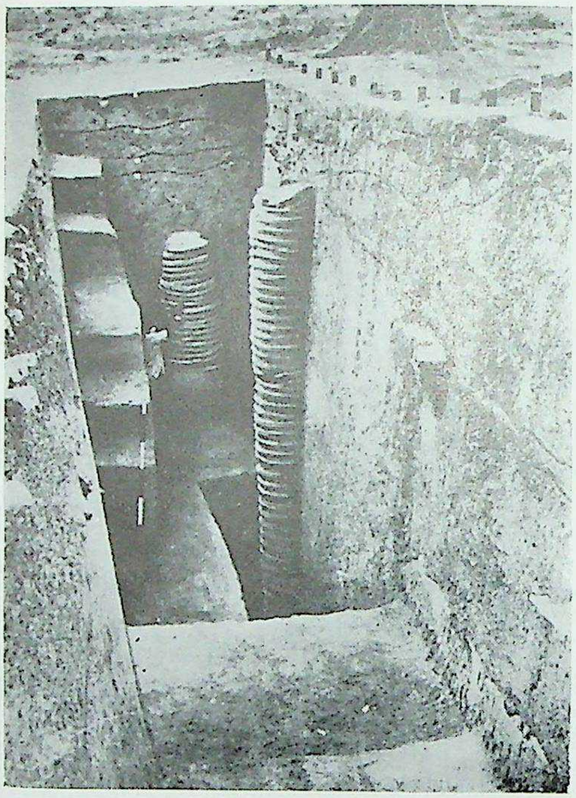

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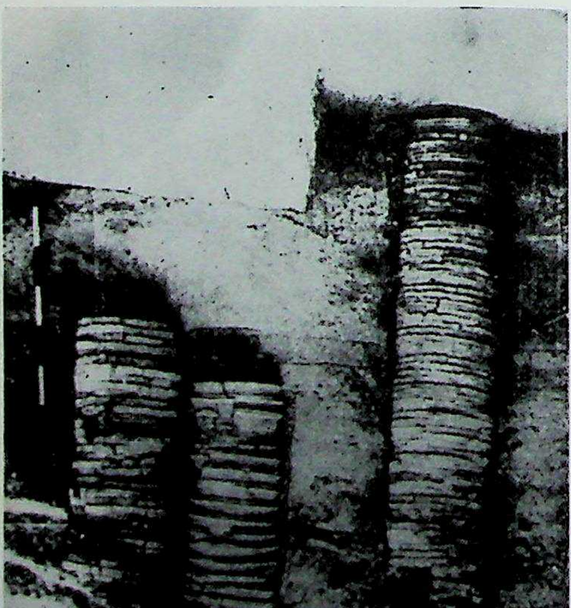

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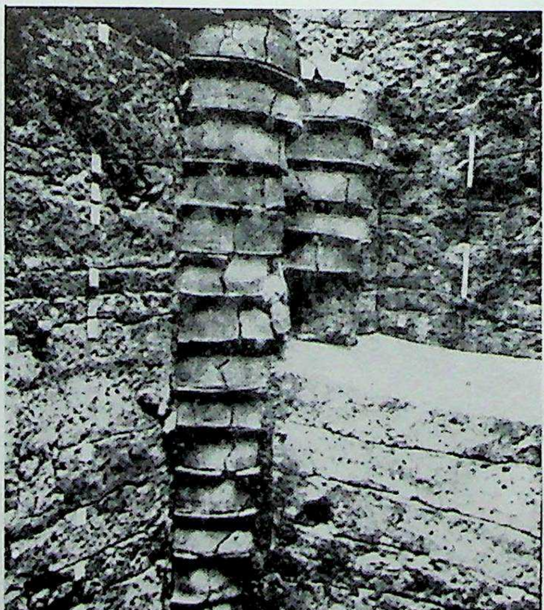

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PLATE 6

Ring Wells from the mature phase of the Ganges Civilization :

A. Brick-lined soak-pit at Nevasa (Maharashtra).

B. Ring wells in close proximity at Ropar (Punjab).

C. Ring wells at Ujjain (M. P.).

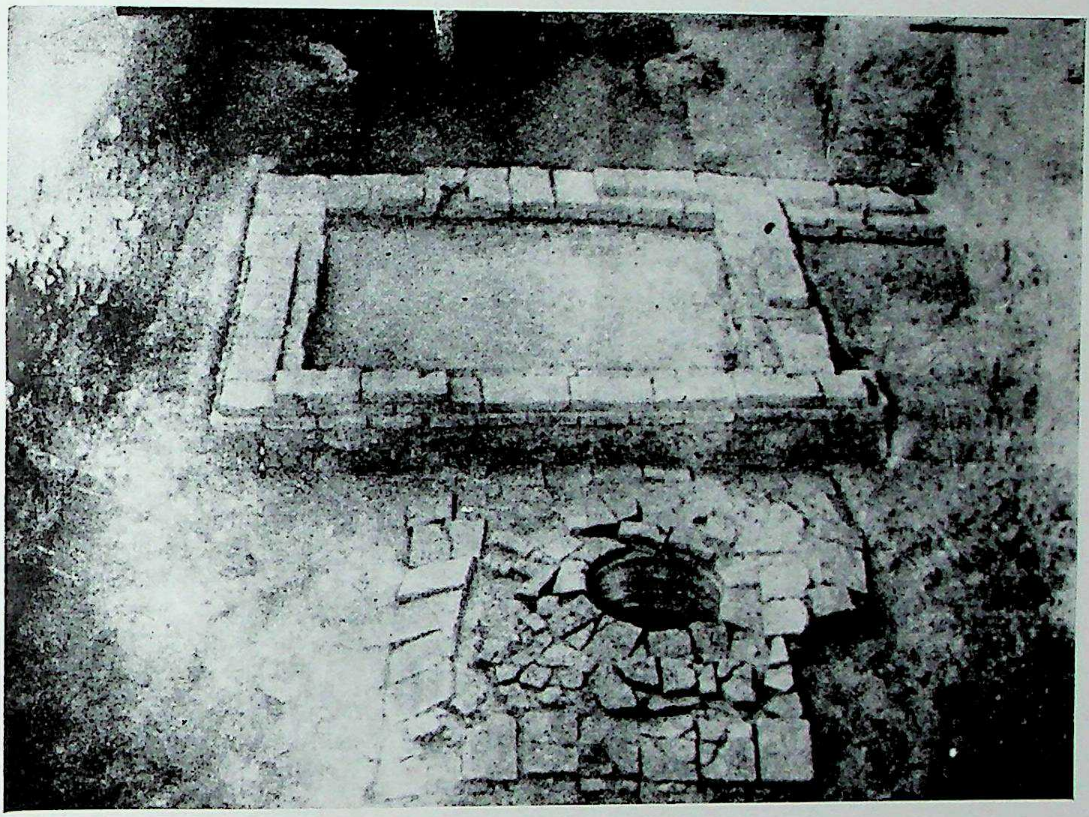
D. Ring wells at Tilaura-kot (Nepal).

PLATE 7

Ring Wells used as draw-wells :

A. Ring well with a facing of brick pavement near a room at Rajghat (U. P.).

B. Ring well capped by a stone with rope-marks on the innerside at Sisupalgarh (Orissa).



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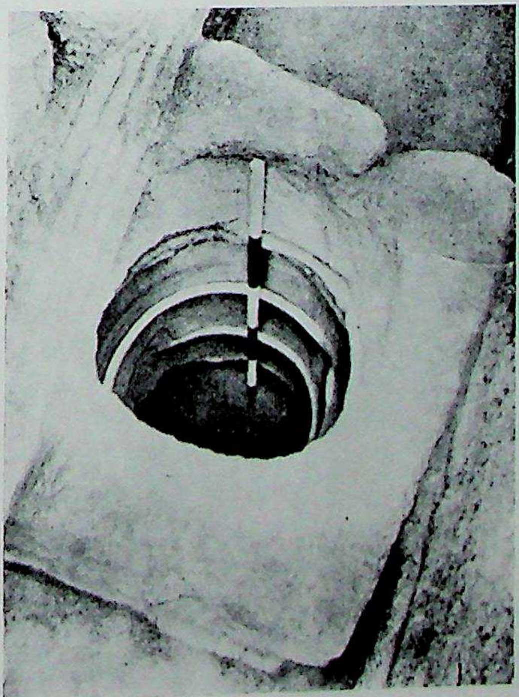

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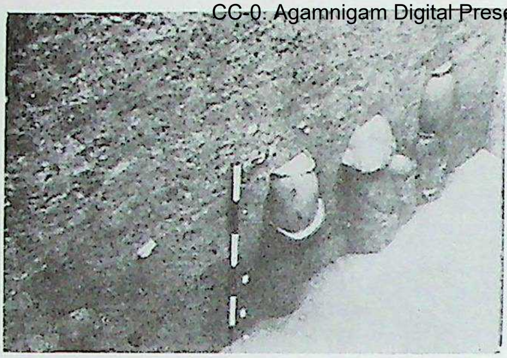

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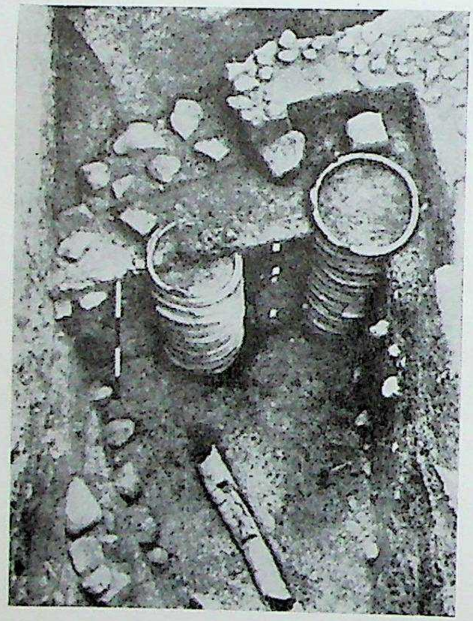

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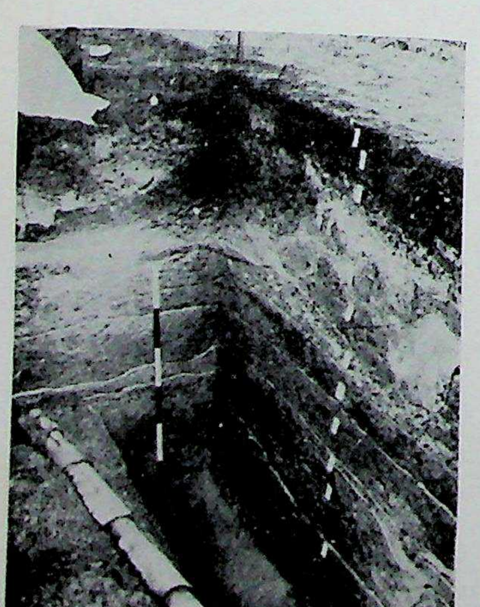

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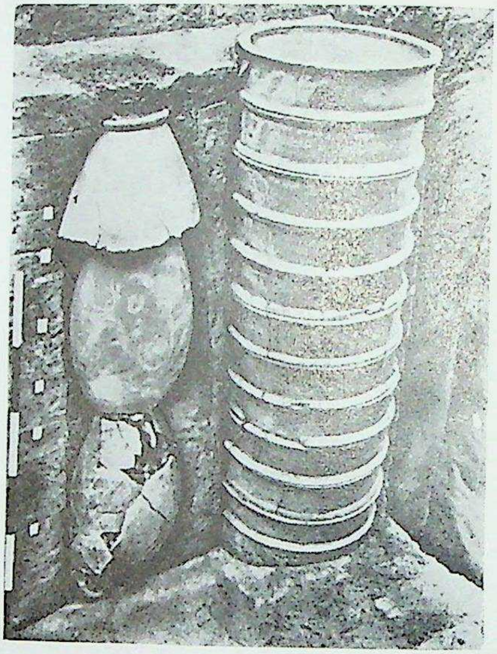

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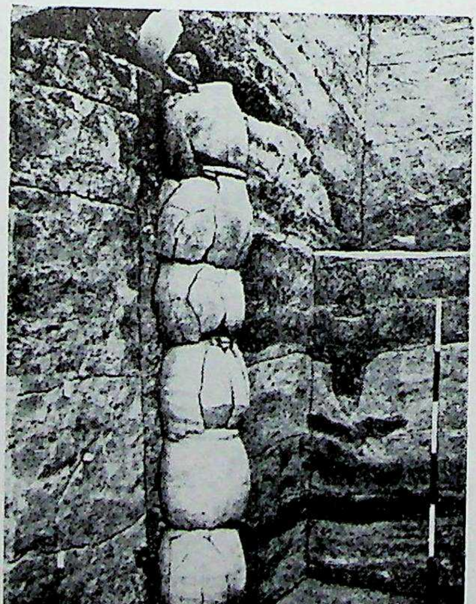

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PLATE 8

Earthen jar soak-pits and Pottery Drains :

A. Soak-pit with three earthen-jars with perforated bottoms at Hastinapura. Close to it is a Ring well (U. P.).

B. Soak-pit with seven earthen jars with perforated bottoms at Prakash (Maharashtra).

C. Earthen jar soak-pits in close proximity at Vaisali (Bihar).

D. A pottery-drain in the vicinity of a Ring well at Ujjain (M. P.).

E. A pottery-drain at Chandraketugarh (West Bengal).

PLATE 9

Baked-brick and stone drains :

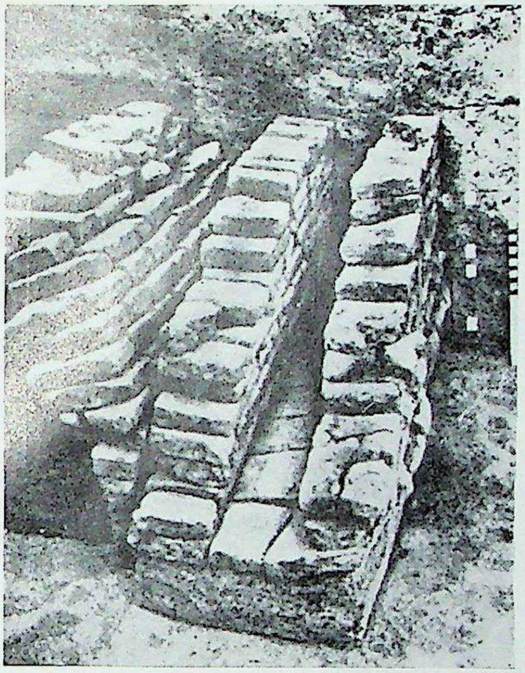
A. Baked brick drain provided with brick floor and lining at Hastinapura (U. P.).

B. Baked brick drain provided with brick floor and lining at Purana Qila (Delhi).

C. A baked brick drain at Kausambi (U. P.).

D. A stone drain (flush-pointed) at Kausambi (U. P.).

E. A brick drain passing close to a Ring well at Mathura (U. P.).



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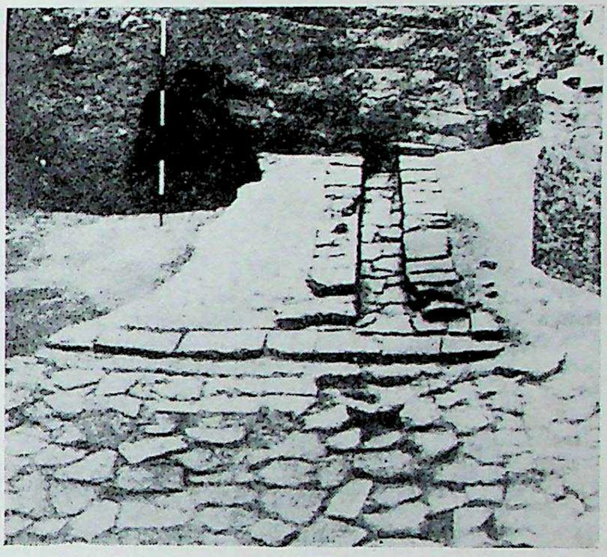

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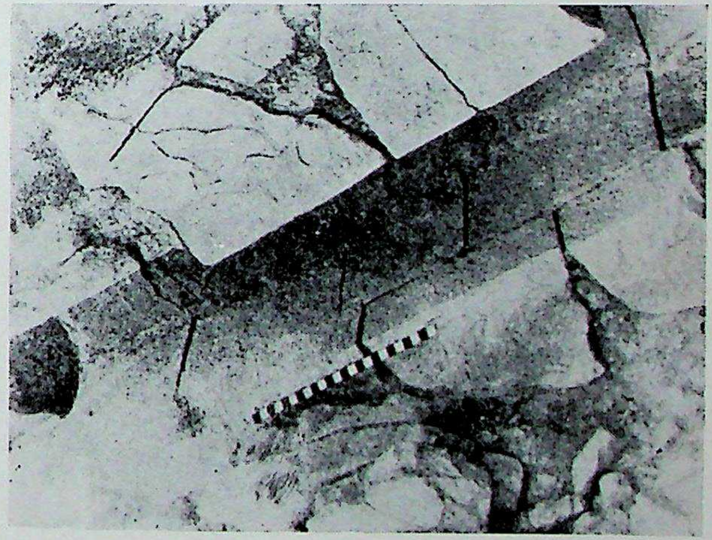

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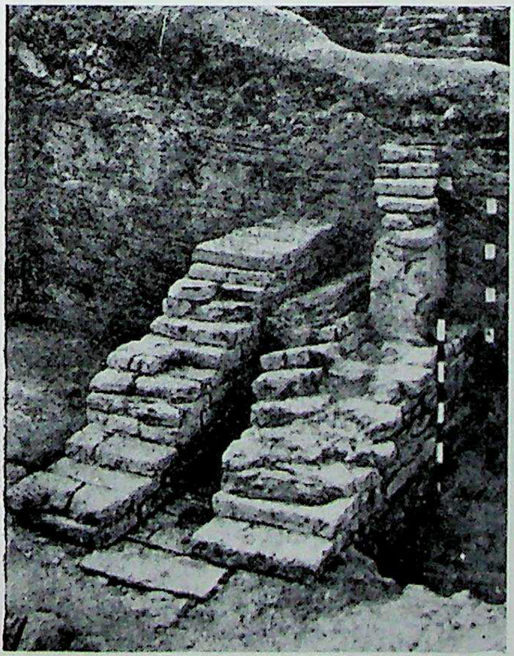

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PLATE 10

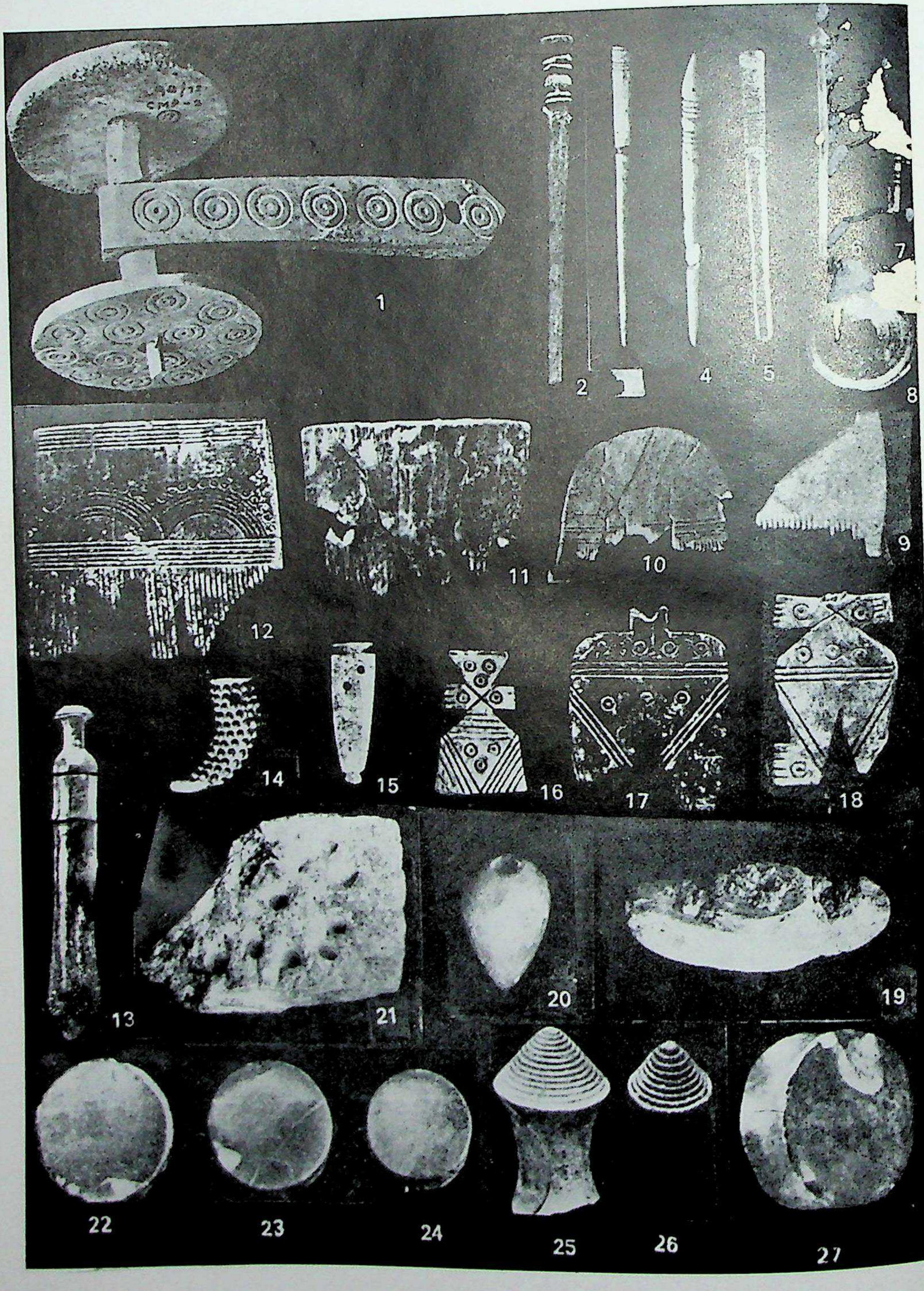
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PLATE 10

Miscellaneous Objects of Bone, Ivory, Shell, Horn, Terracotta and Jasper from the mature phase of the Ganges Civilization :

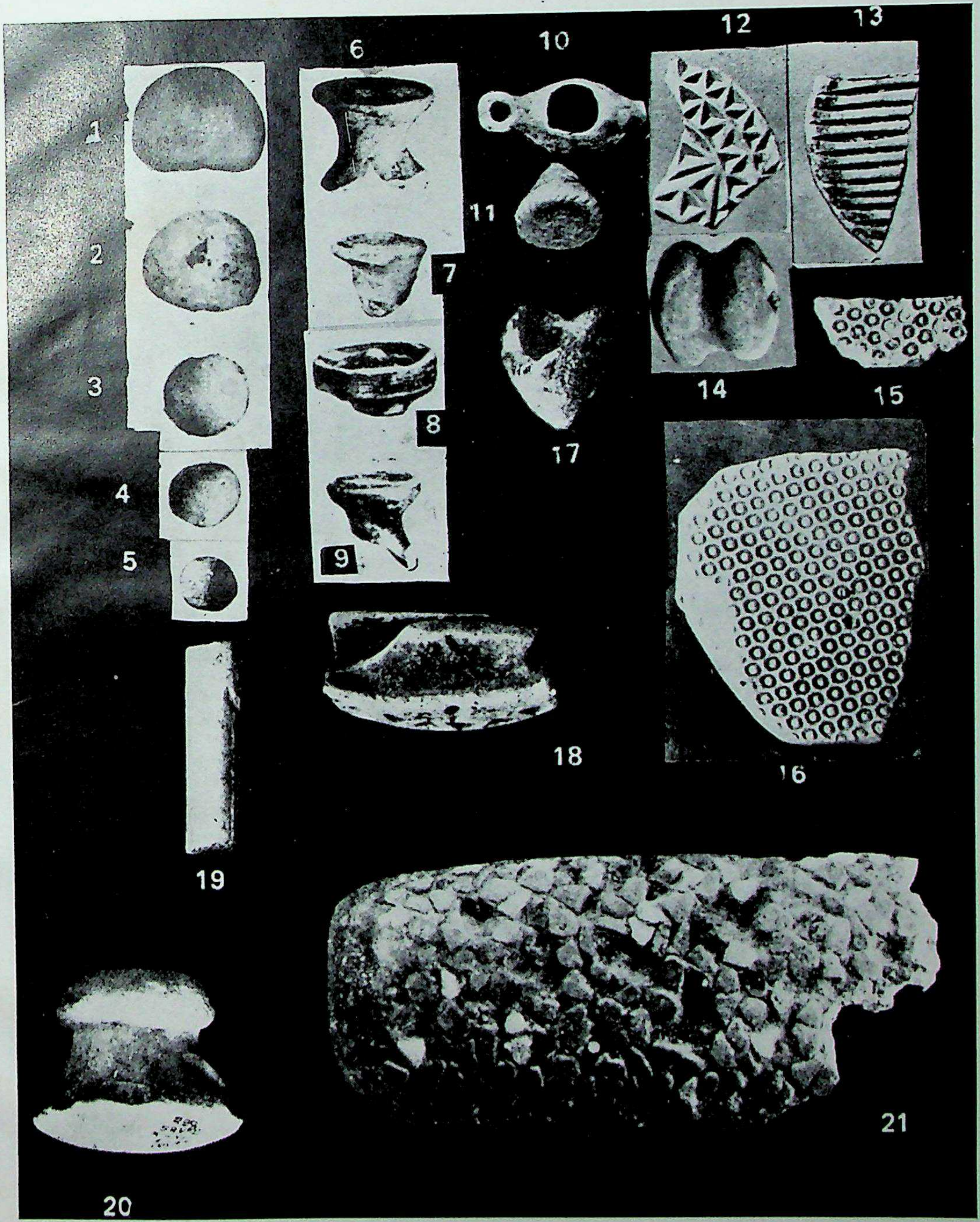
No. 1 : Tortoise shell cart from Champa (Bihar).
No. 2 : Ivory hair pin from Nagda.
Nos. 3 and 4 : Ivory hair pins from Ujjain.
Nos. 5, 6 and 7 : Ivory hair pins from Prabhas Patan.
No. 8 : Bone stopper from Hastinapura.
Nos. 9 and 10 : Combs of ivory from Ujjain.
No. 11 : Ivory comb from Prakash.
No. 12 : Ivory comb from Nagda.
No. 13 : Bone perfume-casket with cover from Prakash.
No. 14 : Horn tooth-pick from Hastinapura.
No. 15 : Ivory pendant from Prabhas Patan.
No. 16 : Ivory plaque resembling female figure from Prabhas Patan.
Nos. 17 and 18 : Ivory plaques resembling female figure from Nagda.
No. 19 : A goldsmith's hammer of bone from Sravasti.
No. 20 : A plumb-bob of bone from Sravasti.
No. 21 : A skin-rubber of bone from Sravasti.
Nos. 22, 23 and 24 : Jasper weights from Vaisali.
Nos. 25 and 26 : Terracotta ear-ornaments from Vaisali.
No. 27 : Pulley-shaped ear-ornament of red jasper from Prakash.

PLATE 11

Terracotta Objects from the early phase of the Ganges Civilization :

Nos. 1 to 5 : Balls from Prahladpur; Nos. 6 to 9 : Stoppers from Prahladpur; Nos. 10 & 11 : Feeding cup and conical seal from Hastinapura; Nos. 12 and 13: Caskets from Prakash; No. 14 : Spool from Prakash; Nos. 15 and 16 : Tiles from Sravasti; No. 17 : Crucible from Sravasti; No. 18 : Head-scratcher from Sravasti; Nos. 19 and 20 : Cylindrical stick and dabber from Sravasti; No. 21 : Pestle from Masoan.

PLATE 11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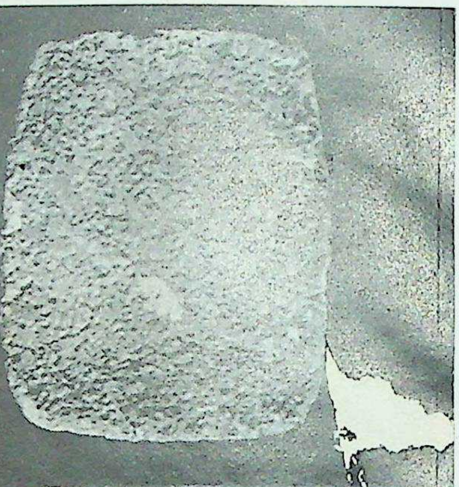

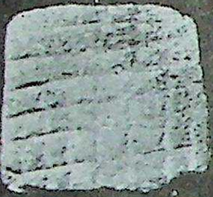
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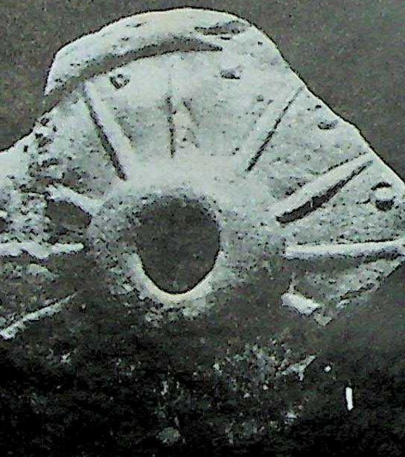

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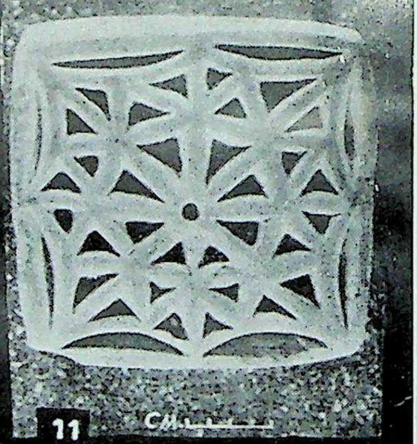

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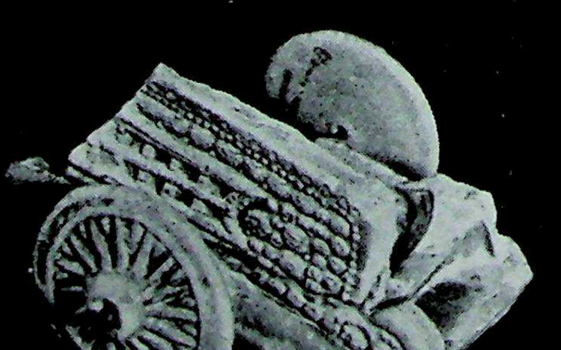
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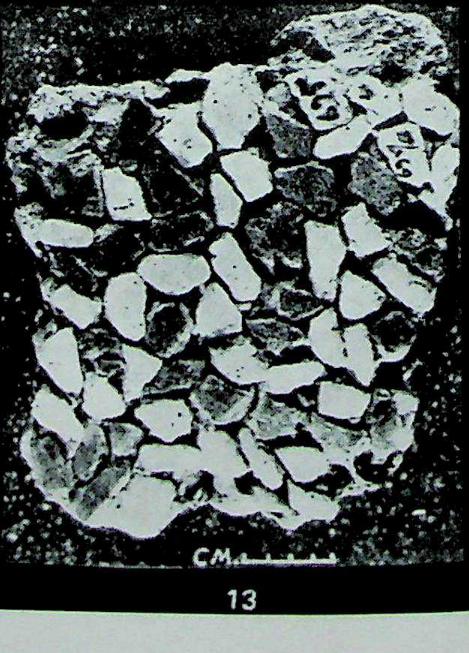

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PLATE 12

Terracotta objects from the mature phase of the Ganges Civilization :

No.1 : Gamesman from Hastinapura; No. 2 : Seal-impression from Hastinapura; Nos. 3 and 4 : Wheels from Pataliputra; Nos. 5 and 6 ; Skin rubbers from Hastinapura and Pataliputra; Nos. 7 and 8 : Head scratcher and a feeder from Prakash; No. 9 : Terracotta pestle from Atranjikhera; No. 10 : Toy-cart wheel from Vaisali; No. 11 : Printing block from Atranjikhera; No. 12 : Potter's stamp from Sravasti; No. 13 : Mosaic fragment from Atranjikhera; No. 14 : Terracotta toycart from Atranjikhera.

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